UNIVERSITY OF CALIFORNIA PUBLICATIONS

COLLEGE OF AGRICULTURE

AGRICULTURAL EXPERIMENT STATION

BERKELEY, CALIFORNIA

# HONEY PLANTS OF CALIFORNIA

By M. C. RICHTER

**BULLETIN No. 217**

Berkeley, Cal., June, 1911

SACRAMENTO

W. W. SHANNON - - - - SUPERINTENDENT OF STATE PRINTING

1911

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# HONEY PLANTS OF CALIFORNIA.

## INTRODUCTION.

This Bulletin attempts to present an account of that flora in California which is visited by the honey bee for the purpose of gathering nectar, other sweetish material, pollen and propolis. There has been no work of this kind heretofore published; and what literature we possess is but fragmentary, being confined to a few short accounts and notes in the various apicultural and agricultural journals on some honey plants. Owing to a demand among the beekeepers for a work of this kind, and as six other states—Texas, Nebraska, Massachusetts, Arizona, Oklahoma, and North Carolina—already possess lists (Experiment Station Bulletins[1]) of their honey-producing floras, this station has seen fit to prepare this publication. It is the result not only of a compilation of all literature obtainable upon the subject, but also of field work in different parts of the State during the past four years. Many beekeepers have been consulted on the university demonstration train, at various farmers' institutes and beekeepers' conventions.

The nomenclature that has been followed is that of the Index Kewensis, Plantarum Phanerogamarum.

Local common names have been noted whenever known. If more than one name is given, the first mentioned should be preferred to all others, either because most frequently used, or for other reasons.

The statements of the geographical distribution of many of the different species are taken from botanical works of California. When this is so, the quotation is followed by the name of the author alone. The publications referred to are the following:

W. L. Jepson, "Flora of Western Middle California."
LeRoy Abrams, "Flora of Los Angeles and Vicinity."
H. M. Hall, "Compositæ of Southern California."

For descriptions of most of the native species, the reader is referred to the above publications.

The account of each plant gives, in as condensed a form as seemed advisable, all information that will tend to help the beekeeper in ascertaining its value as a honey plant. This knowledge, if gleaned from literature, receives the author's name and reference is made to the citation. All other accounts are the result of personal observations by the writer, except in those cases where "reported to" or similar statements are made, in such cases they are the result of either conversation or correspondence with beekeepers. A star prefixed to the name of a

[1]The North Carolina List is published by the North Carolina Department of Agriculture.

plant indicates that a specimen of that plant is to be found in the herbarium (54 species) of "The Honey Producing Flora of California," of the University of California, which is open to the inspection of the beekeepers of the State.

It must be noted that atmospheric conditions play an exceedingly important part in the quantity of nectar secreted by the different plants. A good honey plant in one locality may prove actually worthless as such


FIG. 1.—California Honey Regions (Santa Catalina Island is indicated in the text by X).

in another. A difference of only a few miles may show a marked change in the nectar-secreting powers of some plants; a fact which has given rise to the so-called "alfalfa honey belt" and "lima bean honey belt." The color, aroma, body and granulating propensity of honeys are likewise influenced by climatic conditions as well as by altitude, the character of the soil and its moisture content. The color of honey, but only to a very slight degree, is affected also by the character of comb (brood) in which it is stored. A difference of opinion among beekeepers, as to

the source of some honeys, is often due to a failure to recall that an exceedingly small amount of aromatic honey may impart a characteristic flavor to a large bulk of mild honey.

These basic factors in determining the nectar-secreting values of plants have been mentioned in order to point out: first, how necessary it is to make close and careful observations in determining the real worth of a plant throughout its entire distribution as a yielder of nectar, and, secondly, that the beekeeper in making a selection of honey plants in a given vicinity, should do so very cautiously, ever bearing in mind that an excellent honey plant in one locality *may* not live up to its reputation in another.

The present bulletin is by no means complete, and must be considered merely as a preliminary account of our melliferous flora. The writer's intention is to continue this work, and any additional data and information pertaining to bee botany, as well as the correction of whatever errors that may be found, will be appreciated.

He wishes to thank Dr. H. M. Hall for the assistance which he has given in the identification of some of the flora and in the arrangement of the botanical sequence herein followed, and in reading the proof. To Professor W. L. Jepson, who has rendered valuable help, and to Professor C. W. Woodworth, under whose supervision this Bulletin has been written, he wishes also to extend his thanks.

## THE DISTRIBUTION OF THE HONEY PLANTS.

California possesses an unusual number of different forms of plant life. This is, to a great extent, due to a diversified topography and to the resulting influence this bears upon climate. If the State be considered geographically, it may, from the standpoint of the distribution of its melliferous flora, be divided into eleven districts. These districts, although they contain many honey plants in common, yet possess enough different forms to materially change the methods of beekeeping in each of the several districts. The different honey flora of the various sections is, to a certain extent, responsible for this. Not only has each such division many different honey-producing plants, but in some cases where a plant is a good producer in a number of regions, it may, in one particular region, be so influenced by either climate, altitude, soil, etc., that it will yield little, if any, nectar.

The boundaries between these divisions are by no means distinct, for that boundary line which would satisfy one plant would not necessarily include the zone of another. The relative importance of the honey plants of each district is given in brief survey in the following paragraphs:

SOUTHERN COAST RANGE.

(S)

Those eucalypti grown very near the coast where they are favored by warm winter weather often furnish the bees with a twenty to a fifty pound surplus during the winter months. Along river bottoms the willow and cottonwood provide the first bloom to stimulate bees to breeding, and, on the higher foothill sagebrush ("old man") and manzanita are the first to start activity among the bees. The acacia, wherever grown, also furnishes some of the first pollen. Following these there is an abundance of minor bloom, such as wild cherry, ceanothus, buckthorn, wild currant, wild blackberry, oak, poison oak, and figwort. Those spring plants known to yield surplus crops are: filaree, burr clover, mustard (Lompoc Valley), caterpillar phacelia (Ventura County), orange, and black sage, the latter, as is well known, is the principal honey plant of southern California. The summer bee forage consists of the black, purple, and white sages (blooming in the order named), wild alfalfa, horehound, barberry, pepper tree, and sunflower. On the sand dunes in San Diego County ice plant yields a white honey which candies very readily. In the vicinity of Ventura and Oxnard the lima bean yields an excellent honey during parts of July and August. Late summer and fall plants are: white sweet clover, Christmas berry, tarweed (a dark and bitter honey), sumac, wild buckwheat, turkey mullein and blue curl. The leading honey-producing counties are, in the order named, Ventura, Los Angeles, San Diego, Orange, and Santa Barbara.

IMPERIAL VALLEY.

(I)

This is the only section in California where a scarcity of pollen may exist. The bloom of the wild hollyhock is the first for the bees to visit, and when this ceases they go to work upon the cantaloupes which come into bloom soon after, and which furnish an abundance of pollen, as well as yielding some honey. During the latter part of May arrow weed, growing along irrigation ditches and canals, secretes a great deal of nectar, but alfalfa coming into bloom at about the same time, is the main source of honey in the valley. There is a constant flow from this source, but occasionally the first crop does not yield as much as the others, while the last crop is a little dark in color. Mesquite is the last to yield honey, but it is not at all constant in its secretion; one year the bloom lasting three weeks and another year only one week. It has, however, two blooming periods, both of which vary to a considerable extent. Cotton is now being planted in the valley to a considerable extent, and it may prove valuable for the beekeeper. *Eucalyptus rostrata,* which does well here, and the date palm, which also will, no doubt, be under extensive cultivation before long, are plants which bee men are looking

upon with much favor. Much of the information regarding the honey plants of this valley has been secured from Mr. George of this section.

### PLATEAU REGION.

(P)

The willow and cottonwood along river beds and the manzanita (2,000 to 9,000 feet, November to February)[1] are again the two chief plants that are responsible for the earliest breeding among the bees. Eucalypti, however, whenever planted, aid materially. Wild lilac (pollen), buckthorn, filaree (300 feet, January to May), and *Phacelia tenasitifolia* are the very early spring plants. The orange is a splendid yielder in the vicinity of Riverside, Redlands, and San Bernardino. Next comes the black sage (1,700 to 5,000 feet, April to June), wild alfalfa (1,200 to 2,500 feet, June to July), wild buckwheat (1,200 to 5,000 feet, July to December), and sumac; all of which are excellent producers. What is known as "Straight Up Cactus" by some of the beekeepers of these mountains is reported to yield considerable honey. The Yucca and prickly pear are also good yielders. During the fall a good deal of blue curl honey is stored, and late fall showers do not greatly alter the constancy of nectar secretion of this plant at a 2,300-foot altitude, on the plains of the Sacramento and San Joaquin valleys, however, an unusual nectar secretion of blue curls follows a light, soft rainfall. The counties of this district that figure in honey shipments are San Bernardino, Riverside, San Diego, Inyo, and Kern.

### SANTA CATALINA ISLAND.

(X)

Much of the honey-producing flora of this island is greatly reduced by some twenty-five thousand head of sheep. Even a large percentage of the bloom of the black and white sage is yearly eaten by sheep. Yet eucalypts, Christmas berry, and a great abundance of sumac will always afford a quantity of nectar. In March and April, when there is but little wind, the bee forage consists of the caterpillar phacelia, phacelia ramosissima and sow-thistle, followed by oak, tocalote, and an abundance of turkey mullein.

### OWENS VALLEY.

(O)

Mr. William Muth-Rasmussen of Independence has kindly furnished the following information. He states that with three or four feet of snow on the ground in January a good crop of honey is usually assured. Willow is the first bloom, coming in February, with the deciduous fruits in March and April, shortly followed by the oak and locust. Alfalfa,

[1]The altitudes and dates are those for the San Bernardino mountains and were furnished by Mr. G. D. Bullock, of Redlands.

the principal honey producer, commences to bloom about the middle of May and ends the latter part of September. Other surplus yielders are sweet clover and wild buckwheat, both commencing to yield in July. Those plants which help to some extent are grapes (pollen), catnip, horehound, golden road, ragweed (pollen), and *Cleome lutea* (yellow). During September and October rabbit brush yields a honey of a disagreeable smell and taste which is left on the hives for the bees to winter upon.

FOOTHILLS OF THE SIERRAS.

(F)

In the lower portion of the foothills some eucalypti and the willow provide the first bloom, and higher up in the canyons it is the manzanita. This tree very often yields an extraction of a white-colored and delicious honey. Filaree, burr clover and fruit bloom follow in many sections, but the next honey plant of importance is the creeping sage. During favorable seasons it is reported to yield exceptionably well in Nevada and El Dorado counties. Minor spring and summer plants are mustard, wild onion, buckeye, birch brush, morning glory, milkweed, wild alfalfa, grease wood, and Spanish needle. The coffee berry (wrongly called *Cascara sagrada*) and the Christmas berry, with alfalfa, are the principal honey plants blooming respectively in May and July. Pennyroyal and "witch hazel" yield some honey in El Dorado County. Kern, Tulare, Fresno, El Dorado, Nevada, Yuba, and Placer are the chief honey-producing counties of this section.

CENTRAL VALLEY.

(C)

In this valley bees continue to breed during the winter if kept in the vicinity of *E. robusta* (November to December) and *E. globulus* (December to January). The willow bloom follows shortly after. Next of importance are the deciduous fruits (almond, February 15th, others in March), followed by the orange (April 15-20 to May 15), filaree, burr clover, fiddle neck, tarweed and other spring flowers. When this bloom ceases a scarcity of nectar of about one month's duration exists, except in some favored localities where either the white or yellow sweet clover are found. This is relieved by alfalfa (second crop, the first not yielding), which begins to yield about the first week in June. It is the valley's mainstay, and continues to secrete nectar throughout the summer months, with the last month in the fall seldom producing any nectar. The fall bloom consists of four good honey plants, namely, jackass clover, blue curl, alkali weed, and spike weed. They all bloom on the plains favoring the poorer or alkaline soils, with the exception of blue curl, which is frequently found among the stubble of grain fields as well as in pasture lands. All vary greatly in nectar secretion, but usually when any one plant commences to once yield well, it will con-

tinue to do so until the first nights of frost set in or up to the first heavy rain. Those counties producing the most honey are Fresno, Tulare, Kern, and Kings.

### MIDDLE COAST.

(M)

In December the willow, cottonwood, eucalypti and mustard act as stimulators, and they are shortly followed by the manzanita, which usually yields a surplus. Other excellent honey plants are poison oak, barberry, black sage (main producer), and Christmas berry. In the mountainous regions of Monterey County, according to Mr. Gauze of Jolon, the manzanita does not bloom until March or April, and during May with favorable weather, Chia (an annual sage) yields a good crop, but usually the season proper does not commence until June, when the bees store honey from wild alfalfa, bastard sage and wild buckwheat (not a regular producer). During the past few years some of the best sage ranges have been supplanted by eucalypti and fruit trees. In September and October honeydew from the oak is gathered in considerable quantities.

### SAN FRANCISCO AND BAY COUNTIES.

(B)

During the winter months bees breed well on eucalypti and acacia, the former often yielding considerable honey. In the foothills manzanita provides the first nectar. Many of the spring flowers, with fruit bloom, furnish honey. They are filaree, burr clover, figwort, oak, poison oak, buckeye, mustard, locust and others. In the vicinities of cities and towns considerable honey is stored from garden flowers. The sage in the foothill regions of Alameda and Contra Costa counties occasionally yields an abundance of honey.

During late summer and fall some horehound, tarweed and honeydew honey are often stored. The leading bay counties are Santa Clara, Alameda, Contra Costa, and Marin.

### NORTHERN VALLEY.

(N)

The season in the valley opens with pollen from the chickweed, acacia, poplar and willow, the latter sometimes yielding honey. The deciduous fruits bloom next, accompanied and followed by filaree, burr clover, mustard and other minor spring bloom. Between spring and summer there is usually a scarcity of honey, but in a few favored sections May weed, Napa thistle, and white sweet and yellow sweet clover yield some honey. During summer the bee pasturage consists of alfalfa, carpet grass, white sweet clover, smartweed, thistles, button willow (restricted), and some vegetable bloom, such as carrots, onions, asparagus and melons. Alfalfa and carpet grass continue to furnish honey during the fall. In

the lowlands peppermint and blue thistle secrete nectar between June and November. In San Joaquin County considerable honeydew of inferior quality is gathered from the willow.

On the plains, according to Mr. B. B. Hogabloom of Elk Grove, during a normal season are found yellow sticker (July 1st), tarweed (July 15th, with a flow lasting twenty days), and blue curl (August 1st). During winter the eucalypti furnish some honey. The principal beekeeping counties in this district are Sacramento, Yolo, Colusa, and San Joaquin.

### KLAMATH DISTRICT.

(K)

The first bee forage in the most northern region is again willow. It is soon followed by a variety of spring bloom, with filaree and burr clover predominating. At Yreka and other cities and towns the locust tree affords some honey. Both white and red clover are found near Edgewood and Montague, from which bees are reported to gather honey. Considerable white sweet clover is not only present, but is rapidly spreading in almost all the regions of this district. It is a splendid honey yielder here. In Merrill, Shasta, and Scott valleys, and especially about Edgewood and Gazelle, alfalfa has proven the principal honey plant, with the second crop yielding the most. At Gazelle there is a yellow sage reported to yield a stringy honey, and Scott Valley reports another sage to be a honey producer. Some of the minor plants are a certain species of ceanothus, manzanita, tarweed, and turkey mullein. The common horehound is also represented in this district.

## CHART OF HONEY PLANTS.

The chart below consists of an arrangement into groups based on the ability of the various honey plants to secrete nectar and can only be approximately correct, for the behavior of many such plants in the different localities, even during the same season, is so variable that a fair percentage of them would constantly need shifting from one division to another. The first group aims to include all those plants from which bees are known to gather a surplus amount of honey during an average season. In the second group are found those which only under very favorable climatic conditions will secrete enough nectar to make an extraction of honey possible. It also includes that flora which greatly stimulate bees to breeding and to "fill up" for winter. The last group contains all plants which bees are known to frequent, and which are not already mentioned in the two above divisions. Most of the plants listed in this group are only visited by bees during unfavorable seasons or where honey-producing plants are scarce, and do not, generally speaking, secrete nectar in sufficient quantities for the bees to store.

## FIRST GROUP.

Honey plants yielding a surplus during an average season.

| Common name. | Blooming period. | Region. | Botanical name. |
|---|---|---|---|
| Yucca | Je Jl | S I P O | Hesperoyucca whipplei. |
| Willow | Ja F Mr | S I P O F C M B N K | Salix (sp.). |
| Wild Buckwheat | Ap My Je Jl Ag S O N | S P O C M | Eriogonum fasciculatum. |
| | Mr Ap | S M | Berberis pinnata. |
| Black Mustard | My Je Jl | S P F C M B N | Brassica nigra. |
| English Mustard | Ap My | S | Brassica (sp.). |
| Rocky Mt. Honey Plant. | Mr Ap My | P O | Cleome integrifolia. |
| Jackass Clover | Ag S O | C | Wislizenia refracta. |
| Christmas Berry | Je Jl | X S P F C M B | Heteromeles arbutifolia. |
| Pear | Mr | S P O F C M B N | Pyrus communis. |
| Apple | Mr | S P O F C M B | Pyrus malus. |
| Wild Alfalfa | F Mr Ap My Je Jl Ag S | S P C | Lotus glaber. |
| Burr Clover | F Mr Ap My Je | S P O F C M B N K | Medicago denticulata. |
| Alfalfa | Ap My Je Jl Ag S O | I P O F C N K | Medicago sativa. |
| Sweet White Clover | Je Jl Ag | S P O C | Melilotus alba. |
| Sweet Yellow Clover | My Je | S P O C N | Melilotus officinalis. |
| Lima Bean | Jl Ag | S | Phaseolus lunatus. |
| Alfilerilla | F Mr Ap My Je | S P O F C M B N K | Erodium cicutarium. |
| White Stem Filaree | F Mr Ap My Je | S P O F C M B N | Erodium moschatum. |
| Orange | Mr Ap My | S P | Citrus aurantium. |
| Tree of Heaven | Je | S P C | Ailanthus glandulosa. |
| Poison Oak | Ap My | X S M B | Rhus diversiloba. |
| (Laurel) Sumac | Je Jl | X S P M | Rhus laurina. |
| Pepper Tree | My Je Jl | S P M B | Schinus molle. |
| California Buckeye | Je | F B | Aesculus californica. |
| Coffee Berry | Je | S P F M N | Rhamnus californica. |
| Cascara Sagrada | My | N K | Rhamnus purshiana. |
| Wild Hollyhock | Ja | I | Sidalcea malvaeflora. |
| Prickly Pear | My Je Jl | S P | Opuntia lindheimeri occidentalis. |
| Lemon Scented Gum | Je | S P C M B N | Eucalyptus citriodora. |
| White Stringy-bark | Ag | S | Eucalyptus eugoniodes. |
| Blue Gum | Ja F Mr Ap My Je | X S P O F C M B N | Eucalyptus globulus. |
| Red Gum | My Je Jl | S P O F C M B N | Eucalyptus rostrata. |
| Manna Gum | Jl Ag | S | Eucalyptus viminalis. |
| Blue Thistle | Ag S O | N | Cryngium articulatum. |
| Manzanita | Ja F | N D S P F M B K | Arctostaphylos (sp.). |
| Yerba Santa | Je Jl | S B N | Eriodictyon trichocalix. |
| Caterpillar Phacelia | Ap | X P C | Phacelia hispida. |
| Valley Vervenia | Ap | P C | Phacelia tenacetifolia. |
| Carpet Grass | Je Jl Ag S O | C N | Lippia nodiflora. |
| Horehound | My Je Jl Ag S | S P C B N K | Marrubium vulgare. |
| Peppermint | Jl Ag S O N | N | Mentha spicata. |
| White Sage | Ap My Je Jl Ag | X S P | Salvia apiana. |
| Thistle Sage | Mr Ap My | S | Salvia carduacea. |

FIRST GROUP—*Continued.*

| Common name. | Blooming period. | Region. | Botanical name. |
|---|---|---|---|
| Annual Sage | Mr Ap My | F | Salvia columbariæ. |
| Purple Sage | Ap My Je Jl | S P | Salvia leucophylla. |
| Black Sage | F Mr Ap My Je | X S P M B | Salvia mellifera. |
| Creeping Sage | Ap My Je | M | Salvia sonomensis. |
| Blue Curls | Ag S O | S P F C B N | Trichostoma lanceolata. |
| Button Willow | Jl Ag S | C N | Cephalanthus occidentalis. |
| Napa Thistle | My Je | X N | Centaurea melitensis. |
| Spike Weed | Ag S | C | Centromadia pungens. |
| Bull Thistle | Je Jl | N | Cirsium lanceolatum. |
| Common Sunflower | Jl Ag S | S P C M B | Helianthus annus. |
| Coast Tarweed | Je Jl | B | Hemizonia corymbosa. |
| Tarweed | Je Jl | S P B | Hemizonia fasciculata. |
| (Yellow) Tarweed | Ag S O | N | Hemizonia virgata. |
| "Yellow Tops" | Ap My Je | C | Hemizonia (sp.). |
| Goldenrod | Ag S O | N | Solidago occidentalis. |
| Rabbit Brush (White). | S N | | Chrysothamnus nauseosus hypolluca. |

SUPPLEMENTARY LIST.

Cultivated plants that would rank with the above had they a wider distribution.

| Common name. | Blooming period. | Region. | Botanical name. |
|---|---|---|---|
| Common Century Plant. | Jl | S P B | Agave americana. |
| White Clover | My Je | C B N K | Trifolium repens. |
| American Linden | My Je | S C B | Tilia americana. |
| Tamarisk | Ap My Je | S C | Tamaris (sp.). |
| | Ag S O | | Eucalyptus calophylla. |
| Yate Tree | My Je Jl Ag | | Eucalyptus cornuta. |
| Sugar Gum | Ag S O N | | Eucalyptus corynocalyx. |
| Cider Gum | Ap My | | Eucalyptus gunnii. |
| | Ag S | | Eucalyptus lehmanii. |
| White Ironbark | Ja F Mr Ap | | Eucalyptus leucoxylon. |
| Spotted Gum | My Je | | Eucalyptus maculata. |
| Honey Scented Gum | Ja F Mr Ap | | Eucalyptus melliodora phaceafolia. |
| Red Boxtree | F Mr Ap | | Eucalyptus polyanthema. |
| Red Mahogany Gum | Ag S | | Eucalyptus resinifera. |
| Swamp Mahogany Gum. | Ja F Mr | N D | Eucalyptus robusta. |
| Broad Leaved Ironbark. | Ja | O N D | Eucalyptus siderophora. |
| Victoria Ironbark | Mr | D | Eucalyptus siderоxylon. |
| Apple Scented Gum | Ap | | Eucalyptus stuartina. |
| Forest Gray Gum | My Je Jl | S P F C M B N | Eucalyptus tereticornis. |
| | Ap | S I P C M B N | Wisteria. |

SECOND GROUP.

Honey plants occasionally yielding a surplus.

| Common name. | Blooming period. | Region. | Botanical name. |
|---|---|---|---|
| Asparagus | My Je Jl | N | Asparagus officinalis. |
| Live Oak | Ap | M B | Quercus agrifolia. |
| Blue Oak | Ap | M B | Quercus douglassii. |
| Valley Oak | Ap | S C M N | Quercus lobata. |
| | Ag S | N | Polygonium lapathifolium. |
| Mistletoe | | D S P F M B | Phoradendron (sp.). |
| Common Mustard | F Mr Ap | S P C M B N | Brassica campestris. |
| Wild Radish | Ap My Je | S P C M B N | Raphanus sativus. |
| | Je | B | Escallonica montevidensis. |
| Wild Currant | Ja F | S | Ribes sanguineum. |
| Greasewood | Ap My Je Jl | S P M | Adenostema fasciculatum. |
| Castor Oil Plant | Je Jl | S P | Ricinus communis. |
| Islay or Holly Leaved Cherry. | My | S M | Cerasus illicifolia. |
| Bitter Almond | F | S P F C M B N | Prunus amygdalus. |
| Apricot | Mr | S P F C M B N | Prunus armeniaca. |
| Cherry | Mr | S P F C M B N | Prunus cerasus. |
| Plum and Prune | Mr | S P F C M B N | Prunus domestica. |
| Peach | Mr | S P F C M B N | Prunus persica. |
| Raspberry | Ap My Je | S B | Rubus strigosus. |
| Cultivated Blackberry. | My Je Jl Ag | B | Rubus villosus. |
| Himilayan Berry | Ag | B | Rubus villosus var. |
| Common Wild Blackberry. | | S M B | Rubus vitifolius. |
| Black Wattle | F Mr Ap My Je | S P C M B N | Acacia decurrens mollis. |
| Golden Wattle | F Mr | S | Acacia pycnantha. |
| Rattleweed | | C | Astragalus (sp.). |
| Sweet (Yellow) Clover. | Ap My Je | S P O C N | Melilotus indica. |
| Locust | Ap My | C M B N K | Robinia pseudacacia. |
| Sour Clover | My Je | N | Trifolium fucatum. |
| Alsike | My Je | N | Trifolium hybridum. |
| Gorse | Mr Ap My | B | Ulex europaesus. |
| Mandarin | Mr Ap My | S | Citrus nobilis. |
| | Jl | S | Croton californicus. |
| Turkey Mullein | Jl Ag | X S P | Eremocarpus setigerus. |
| | F Mr Ap | S M | Ceanothus cuneatus. |
| Wild Lilac | Ap My | S M K | Ceanothus (sp.). |
| | F Mr Ap My | S M | Thamus crocea. |
| Grape | My Je | C N | Vitis vinifera. |
| | My Je | B | Tilia (sp.). |
| Cotton | Je Jl Ag | I | Gossypium herbaceum. |
| | Je | B | Godetia bottæ. |
| California Waterweed. | Jl Ag | N | Jussiaea californica. |
| Sweet Fennel | My Je Jl Ag S | S P F C M B N | Foeniculum vulgare. |
| Madrona | Ap | M B | Arbutus menziesii. |
| Oregon Ash | Ap My | N | Fraxinus oregona. |
| Olive | Ap My | P N | Olea europaea. |
| Morning-glory | My Je Jl | N | Convolvulus arvensis. |
| | My Je | S | Gilia chamissonis. |
| Hill Vervenia | Mr Ap | S M | Phacelia distans. |
| | Je Jl | X S M | Phacelia ramosissima. |
| Heliotrope | My Je Jl Ag | S C | Heliotropium (sp.). |
| Lawn Plant | Je Jl Ag | S | Lippia repens. |
| Wild Verbena | Jl Ag S | S P | Verbena prostrata. |

SECOND GROUP—*Continued.*

| Common name. | Blooming period. | Region. | Botanical name. |
|---|---|---|---|
| Yerba Buena | My Je | M B | Micromeria chamissonis. |
| Hedge Nettle | Mr Ap | B | Stachys bullata. |
| California Figwort | Mr Ap My Je | S M B | Scrophularia californica. |
| Simpson's Honey Plant. | Ap My Je | S | Scrophularia vernalis. |
| Watermelon | My Je Jl Ag | S C N | Citrullus vulgaria. |
| Canteloupe | Ja F Mr Ap My | I | Cucumis mello. |
| Cucumber | My Je Jl Ag | S C N | Cucumis sativus. |
| Winter Squash | My Je Jl Ag | S C N | Cucurbita maschata. |
| Pumpkin | My Je Jl Ag | S C N | Cucurbita pepo. |
| Globe Artichoke | Je Jl | S C N | Cynara scolymus. |
| Jerusalem Artichoke | Je Jl | S C N | Helianthus tuberosus. |
| Mayweed | My Je Jl | N | Anthemis cotula. |
| Beggar Ticks | Ag S | | Bidens frondosa. |
| Spanish Needle | Je Jl | C N | Bidens pilosa. |
| | Je Jl | | Coreopsis gigantea. |

SUPPLEMENTARY LIST.

Cultivated plants that would rank with the above had they a wider distribution.

| Common name. | Blooming period. | Region. | Botanical name. |
|---|---|---|---|
| Migonette | Ap My Je Jl | | Reseda odorata et lutea. |
| | Ja F | | Cytisis elongatus. |
| White Tree Clover | Ja F | | Cytisis proliferus. |
| | My Je Jl | | Melilotus bicolor. |
| Poinsettia | Jl | S P | Euphorbia pulcherrima. |

THIRD GROUP.

Honey plants not known to yield a surplus.

| Common name. | Blooming period. | Region. | Botanical name. |
|---|---|---|---|
| Corn | My Je Jl | | Zea mays. |
| Tanbark Oak | Je | B | Quercus densiflora. |
| Virgin's Bower | Je Jl | S M | Clematis ligusticifolia. |
| | Ap | S | Clematis (sp.). |
| California Laurel | Ja F Mr | M B | Umbellularia californica. |
| California Poppy | Mr Ap My Je Jl | S P F C M B N | Eschscholtzia californica. |
| Cream Cups | Ap | C | Platystemon californicus. |
| Canyon Gooseberry | Ja F Mr | | Ribes menziesii. |
| (Western) Choke Cherry. | Ap My Je | S M | Cerasus demissa. |
| California Wild Rose | | S | Rosa californica. |
| Wild Sweet Pea | F Mr | S | Lathyrus splendens. |
| Lupin | Ja F Mr Ap | S M | Lupinus affinis. |
| Nonesuch | My Je Jl | N | Medicago lupulina. |
| Red Clover | Jl Ag S O | N K | Trifolium pratense. |
| Spring Vetch | Mr Ap | S | Vicia sativa. |
| Maple | Mr Ap | N | Acer negundo. |
| Virginia Creeper | Jl | S M B | Ampelopsis quinquefolia. |
| California Wild Grape. | My Je | C | Vitis californica. |

THIRD GROUP—*Continued.*

| Common name. | Blooming period. | Region. | Botanical name. |
|---|---|---|---|
| Small Flowered Mallow. | Ap My Je | S | Malva parviflora. |
| White Mallow | Je | S | Malva sylvestris. |
| | Jl Ag | S | Helianthemum scoparium. |
| Milkweed | Jl Ag S | N | Asclepias mexicana. |
| Milkweed | My Je Jl | N | Asclepias speciosa. |
| Dodder | Jl Ag S | S P F C M B N | Cuscuta. |
| Common Heliotrope | Je Jl Ag S O N | S P F C M B N | Heliotropium curassavicum. |
| | Je | B | Tournefortia heliotropoides. |
| Tule Mint | Ag S | B N | Mentha canadensis. |
| Pennyroyal | Je Jl Ag | S | Monardella lanceolata. |
| Loving Sage | Mr Ap My Je | S | Salvia amabilis. |
| Winter Savory | Je | B | Satureia montana. |
| | My Je Jl Ag | N | Stachys ajugoides. |
| | Je Jl | B | Stachys albens. |
| | Je | B | Veronica andersonii. |
| Common Plantain | My Je Jl Ag | S C B N | Plantego major. |
| Wild Honeysuckle | My Je | S | Lonicera. |
| Blue Elderberry | My Je | S C M B N | Sambucus glauca. |
| Cornflower | My Je | S B | Centaurea cyanus. |
| | Ja F Mr Ap | S | Encelia californica. |
| | Ap My Je Jl | B | Eriophyllum confertiflorum. |
| | Jl Ag S O | B | Heterotheca grandiflora. |
| | Je | B | Malacothris saxatilis. |
| Common Sow-thistle | Mr Ap My Je Jl | X S P C M B N | Sonchus oleraceus. |
| | F Mr Ap | B | Sonchus maruanthus. |

## GYMNOSPERMAE.

### PINACEÆ. Pine Family.

*Pinus* (sp.). PINE.

Cloud's Rest. Yosemite region. A great abundance of aphidian honey.[1]

## ANGIOSPERMAE.

### MONOCOTYLEDONS.

### GRAMINEÆ. Grass Family.

*Triticum sativum* Lam. Wheat.

Introduced: cultivated extensively in the Sacramento and San Joaquin valleys.

Nectar from stubble of wheat prematurely cut.[2]

*Zea mays* L. Maize. Indian Corn.

Introduced: under cultivation throughout California. May-July.

[1]Cook, A. J. Gleanings in Bee Culture. Mar. 15, 1904.
[2]Cook, A. J. Bee Keeper's Guide. Geo. W. York Co. Chicago, 1904.

Some nectar from pistillate bloom and from the intersection of the leaves and stalks, and an abundance of pollen from staminate bloom.

*Sorghum* (sp.). Egyptian Corn.

Tulare County reports Egyptian corn a wonderful pollen yielder.

CYPERACEÆ. Sedge Family.

*Scirpus* (sp.). Tule.

In marshes about Sacramento River.

The tule has been mentioned as a honey plant since many beekeepers claim it to be one, but the writer believes that it yields no nectar. Honey buyers often refer to honey gathered along the Sacramento and San Joaquin rivers as "tule honey."

PALMÆ. Palm Family.

*Phoenix dactylifera* L. Date Palm.

Introduced: cultivated throughout California.

Bees visit the bloom very profusely.

LILIACEÆ. Lily Family.

*Allium* (sp.). Wild Onion.

Vicinity of Sacramento.

This is reported to occasionally yield a surplus in the above locality.

*Allium cepa* L. Common Onion.

Introduced: under cultivation in many parts of the State.

A fine yielder of an amber honey. The characteristic onion flavor of this honey departs when the honey becomes thoroughly ripe.

*Asparagus officinalis* L. Asparagus.

Introduced: under cultivation in different parts of California. May-July.

"Grown principally in the delta country, between Sacramento, Stockton, and Port Costa."[3]

Occasionally yields a quantity of amber honey which, when thoroughly ripe, loses its flavor; considerable orange colored pollen.

*Hesperoyucca whipplei* Baker. Yucca. Spanish Bayonet. Spanish Dagger. Mountain Queen. Roman Candle. Our Lord's Candle.

"Common in the chaparral belt in all our mountains. June-July." *Abrams:* "Coastward slope of the San Bernardino mountains, and southern Sierra Nevada." *Coville:*[4]

Southern Coast Range from Santa Barbara to San Diego counties.

Eagerly visited by bees, and where abundant enough, yields a surplus.

[3]Smith, R. E. Asparagus Rust. Bull. No. 165 Agr. Exp. Sta. of California.
[4]Botany of the Death Valley Expedition, Division of Botany. U. S. Dept. of Agr.

AMARYLLIDACEÆ.

*Agave americana* L. Common Century Plant.

Introduced: cultivated throughout California. July-August.

Very rich in nectar.

## DICOTYLEDONS.

### CHORIPETALÆ.

SALICACEÆ. Willow Family.

*Populus trichocarpa* T. & G. Black. Cottonwood. Poplar.

"Coast Ranges and Sierra Nevada, thence south to southern California as far as Palomar mountain." March.[5]

Some honeydew in the fall in parts of the Sacramento Valley.

Purple pollen in abundance and valuable for early breeding; propolis.

*Salix* (sp.). Willow.

Common along most streams and rivers throughout California. January-March.

A dark amber and bitter honey. Surplus yields have been reported from Sacramento, San Joaquin, Fresno, and Tulare counties. Very important throughout California for the early and abundant pollen it produces, and which is used for breeding purposes; in San Joaquin County much honeydew honey of dark color is gathered in the fall; much propolis. Professor A. J. Cook states that both the plant lice, *Lachnus dentatus* LeBaron, and *Aphis salicti* Harris, secrete sweets, especially in September and October on the willow which the bees visit.[6]

JUGLANDACEÆ. Walnut Family.

*Juglans regia* L. Persian or English Walnut.

Introduced: cultivated principally in Santa Barbara, Ventura, Los Angeles and Orange counties.

Considerable honey and some pollen from the flowers.

FAGACEÆ. Oak Family.

*Quercus agrifolia* Nee. Live Oak. Field Oak. Encina.

North Coast ranges from northern Sonoma County to Marin and to Suisun Valley, and throughout the south Coast ranges, where it is very abundant and widely scattered, to southern and Lower California.[7] April.

Honey and pollen from the flowers; often aphidian honey in the fall.

*Quercus densiflora* H. & A. Tanbark Oak.

Botanical gardens of the University of California. June.

Honey and pollen from the flowers.

[5]Jepson, W. L. The Trees of California. Cunningham, Curtiss & Welch. San Francisco, 1909.

[6]Cook, A. J. Bee Keeper's Guide. Geo. W. York & Co. Chicago, 1904.

[7]Jepson, W. L. The Trees of California. Cunningham, Curtiss & Welch. San Francisco, 1909.

*Quercus douglassii* H. & A. Blue Oak. Mountain White Oak. Rock Oak.

"Throughout middle California: most abundant on the dry foothills of the Coast ranges, especially towards the interior; rarely found on the higher mountain slopes or in the valleys." *Jepson.* April.

Honey and pollen from the flowers. At Jolon (Monterey County) enough honeydew is gathered during September and October to winter bees. No ill effects have been experienced on wintering bees from this source, according to Mr. Gauze, a veteran beekeeper of this section.


FIG. 2.—a Wild Buckwheat. b Smartweed. c Clematis.

*Quercus lobata* Nee. Valley Oak. Roble. Weeping Oak.

"Most characteristic oak in the fields and along the water courses of the Coast Range and interior valleys. April." *Jepson.*

Eagerly visited by bees for both honey and pollen. With favorable climatic conditions considerable honeydew is gathered in the fall.

A Gridley beekeeper reports the honeydew to be water white in color.

LORANTHACEÆ. Mistletoe Family.

*Phoradendron* (sp.). Mistletoe.

Parasitic on pine, cottonwood, buckeye, sycamore, etc. December-January.

Pollen and perhaps honey from the flowers. Mr. Louis Sholl reports for *P. flavescens* Nutt.: "Honey yield abundant and also pollen; very valuable for early brood rearing."[8]

[8]Texas Honey Plants. Bull. No. 102, Texas Agr. Exp. Sta.

POLYGONACEÆ. Buckwheat Family.

*Antigonon leptopus* H. & A. Mexican Rose. Mountain Rose. Coralita.

Listed as a honey plant from California in the 1910 edition of A B C & X Y Z of Bee Culture.

**Eriogonum fasciculatum* Benth. Wild Buckwheat. Flat Top. Fig. 2a.

Very common throughout southern California. April-November.

Honey light amber, of agreeable flavor, and subject to granulation. The principal honey-producing plant in many southern California apiaries. This plant blooms two months earlier on the valley side of the Coast Range mountains. This honey has been analyzed by the United States Department of Agriculture.[9]

*Polygonum bolanderi* Brewer.

"On rocky outcroppings, mostly in the lowest foothills; known only from the Mayacamae Range and parallel chains; Suscol Hills; Hood's Peak; east of Napa City and northward to the La Jota Plateau on Howell mountain. July-September." *Jepson.*

Of this plant Mr. W. A. Gridley of Edgewood says that it grows on the poorest land yielding every year about 20 pounds to the colony between September 20th and October 20th. The honey is amber, and is usually left for the bees to winter upon.

*Polygonum lapathifolium* L. Smart Weed. Common Knot Weed. Willow Weed.

"Common along streams or in low land often whitening great areas. August-September." *Jepson.*

Honey from the flowers, but not as good a honey plant as the dotted smartweed. This is not the smartweed or heartease (*Polygonium persicaria*) of the eastern states.

*Polygonum punctatum* Ell. (Dotted) Smartweed. Fig. 2b.

"Common in low and especially marshy ground, or in moist mountain meadows; Howell mountain. September." *Jepson.* Sacramento Valley, June 15-September.

Yields a great deal of dark honey of poor quality in and about Yolo and Colusa counties, and probably elsewhere.

RANUNCULACEÆ. Buttercup Family.

*Clematis ligusticifolia* Nutt. Virgin's Bower. Hill Clematis.

"Almost throughout California, in the hilly districts, from San Bernardino north to Santa Cruz; San José, Marin County, Ukiah; and Weldon Canyon, Vaca mountains; Sierra Nevada. June-July." *Jepson.*

A great deal of pollen and probably some honey.

[9]Browne, C. A. Chemical Analysis and Composition of American Honeys. Bureau of Chemistry, U. S. Dept. of Agr.

*Clematis* (sp.). Clematis. Fig. 2c.

Introduced: in the cultivated gardens of our cities and towns. April.

Bloom eagerly sought after for both pollen and honey.

*Migella hispanica.*

Botanical gardens of the University of California. June.

A great favorite with the bees.

Fig. 3.—a Common Yellow Mustard. b Black Mustard.

Berberidaceæ. Barberry Family.

*Berberis pinnata* Lag. California Barberry.

"Rather common on hills, mostly along the edge of thickets. Berkeley Hills and San Francisco southward to Monterey. March-April." *Jepson.*

Amber honey. Some sections of Monterey County report surplus yields after the manzanita and poison oak have blossomed and before the sages commence to produce.

Magnoliaceæ. Magnolia Family.

*Magnolia glauca* L. Sweet Swamp, or White Bay Beaver Tree.

Introduced: cultivated throughout California.

Honey from the flowers.

Lauraceæ. Laurel Family.

**Umbellularia californica* Nutt. California Laurel. Bay Tree. Pepper Wood. Spice Tree.

"Throughout California, mainly along mountain streams, more rarely in the valleys. December-March." *Jepson.*

Bees work upon bloom when other melliferous flora is scarce.

Papaveraceæ. Poppy Family.

*Eschscholtzia californica* Cham. California Poppy.

In abundance throughout almost entire California. March-July.

Some honey, and a considerable amount of orange-colored pollen. Eastern beekeepers occasionally claim that bees visiting bloom of the poppy family become diseased, but no such trouble, as far as the writer knows, has been reported in this State. It is interesting to note that Friedrich Huck's "Unsere Honig und Bienenpflanzen," a German work on honey plants, has listed the California poppy as an introduction from California, and as a source of pollen for the bees.

*Playtystemon californicus* Benth. Cream Cups.

"Common almost throughout California, in the hills and on the plains, in April." *Jepson.*

Bees reported to work well on bloom in Madera County.

CRUCIFERÆ. Mustard Family.

**Brassica campestris* L. Common Yellow Mustard. Fig. 3a.

"Very common. February-April." *Jepson.*

Varies in the amount of honey produced according to locality; a considerable quantity of yellow pollen.

*Brassica nigra* Koch. Black Mustard. Fig. 3b.

"Naturalized weed, everywhere common and very abundant in interior grain fields. May-July." *Jepson.*

An excellent honey plant in the Lompoc Valley. In many other localities does not yield as well, probably due to some climatic factor.

Mr. Fred A. Parker, of Lompoc, states that this honey is light amber, has an agreeable flavor, but a peculiarily characteristic odor, and is prone to early crystallization.

*Brassica* (sp.). English Yellow and Trieste, or Red Mustard.

Introduced: under cultivation in Lompoc Valley, where they are grown for seed. April-May.

Character of the honeys from both varieties alike; mild in flavor, of a light color and body, with a tendency for rapid granulation, sometimes four or five days after extraction.[10]

*Raphanus sativus* L. Wild Radish.

"Common weed of waste places in towns and villages about San Francisco Bay; less frequent in the interior." *Jepson.*

"Frequent in poorly cultivated fields and waste places, especially in sandy soils. April-June, or often throughout the year." *Abrams.*

Honey and pollen from the flowers.

CAPPARIDACEÆ. Caper Family.

*Cleome integrifolia* T. & G. Rocky Mountain Honey or Bee Plant.

Reported to have been recently introduced at Banning (2,500 feet),

[10]Oates, W. J. Gleanings in Bee Culture. June 15, 1905.

where it commences to bloom in March and lasts for three months. It thrives exceedingly well in waste places and among rocks, where bees work upon it very eagerly. In other states this plant has been under cultivation for many years as a bee plant.

*Wislizenia refracta* Engelm. Jackass Clover. Stinkweed.

"Sacramento to Lathrop and southward in the San Joaquin Valley. Not abundant in the lower San Joaquin twenty years ago as now (Mrs. K. Brandegee). Grows on the white alkali at Travers and Goshen, but appears only once in two years. Greedily visited by bees when in flower." *Jepson.* August-October.

Honey water-white, mild in flavor, and of good body, granulates in three to six months, when it much resembles a paste made from powdered sugar. The very fact that it is spreading so rapidly over the poor lands of the San Joaquin Valley, and that it produces the only water-white honey, with the exception of blue curls, as far as the writer knows, that is produced in the late fall, has led to the conclusion that jackass clover will be one of the greatest honey-producing plants of this State, and may, in the future, rank next to sage and alfalfa. During the fall of 1909, a Fresno beekeeper reported that he extracted 30 pounds per colony each week for six weeks from this source. Another beekeeper of the San Joaquin Valley relates that during a jackass clover flow the noise was terrific, and that home-coming bees flew so slowly that they could be picked out of the air. It was Henry T. Chrisman of Coalinga, who first became aware of its value as a honey plant, and gave it its present name.

RESEDACEÆ. Mignonette Family.

*Reseda odorata* L. *et lutea* L. Common Mignonette.

Introduced: commonly found in the gardens of our cities and towns. April-July.

Very much visited by bees whenever in bloom.

SAXIFRAGACEÆ. Saxifrage Family.

**Escallonia montevidensis* D. C.

Introduced: an ornamental in the San Francisco parks and elsewhere. June.

Bees visit bloom in great numbers on fine days.

**Ribes menziesii* Pursh. Canyon Gooseberry.

"Outer Coast ranges of middle California. The flowers appear in January or February from winter buds." *Jepson.* Frequent in Santa Barbara County. January-March.

Honey from the flowers.

*Ribes sanguineum* Pursh. Wild Currant. Flowering Currant.

Common near the coast in canyons or on northward slopes. January-March.

"A white flower buckthorn is, with the wild currant, the earliest shrub for the bees to begin on."[11]

ROSACEÆ. Rose Family.

*Adenostema fasciculatum* H. & A. Greasewood, Chamisal. Chamios.

"The most abundant and characteristic bush of the high Coast ranges." *Jepson.* April-July.

Eagerly visited by bees in Lake, Marin, Santa Barbara, and Ventura counties, and, no doubt, elsewhere.

*Cerasus demissa* Nutt.[12] Western Choke Cherry.

"Common: Sierra Nevada mountains; middle north Coast Range (Napa mountains); Oakland Hills; Mount Hamilton." *Greene.*

"Rare on the seaboard or altogether absent. Last of April-June." *Jepson.*

"Occasional in the San Bernardino mountains and San Antonio mountains; in the upper portions of the chaparral belt and in the pine belt." *Abrams.*

Honey and considerable pollen from the flowers.

*Cerasus ilicifolia* Nutt. Islay, or Holly Leaved Cherry.

"Oakland Hills; San Francisco peninsula; Loma Prieta, and southward to Santa Barbara. May-June." *Jepson.* Santa Barbara and south to San Diego County. March-May.

A great aid in building bees up in the spring, furnishing both honey and pollen.

*Eriobotrya japonica* Lindl. Loquat. Japan Plum.

Introduced: under cultivation in parts of southern California.

An excellent honey plant.

*Fragaria chiloensis* Duch. *et* var. Strawberry.

Introduced: very wide distribution; cultivated principally in the Pajaro and Santa Clara valleys, and in the outlying districts of Los Angeles and Sacramento. Blooms at all seasons. Considerable honey and pollen from the flowers.

**Heteromeles arbutifolia* Roem. Christmas Berry. California Holly. Toy-on. Fig. 4.

"Common on mountain sides and along streams everywhere in the Coast ranges, flowering in July." *Jepson.* June-July.

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[11]Pleasants, J. E. Bee Keeper's Review. Oct. 1909.
[12]Some authors include this genus with Prunus.

A thick amber honey with a decided flavor, candying to coarse granules within two or three months after extraction. Surplus crops are reported from Monterey, Colusa, and Nevada counties. The honey is gathered after the sages have bloomed. Mr. Chas. Goodman of Williams says that this honey makes better comb than extracted for the reason that the extracted not only gives off a great deal of scum, but also upon casing it, the upper portion of the honey in the can granulates while the under portion remains in the liquid state.

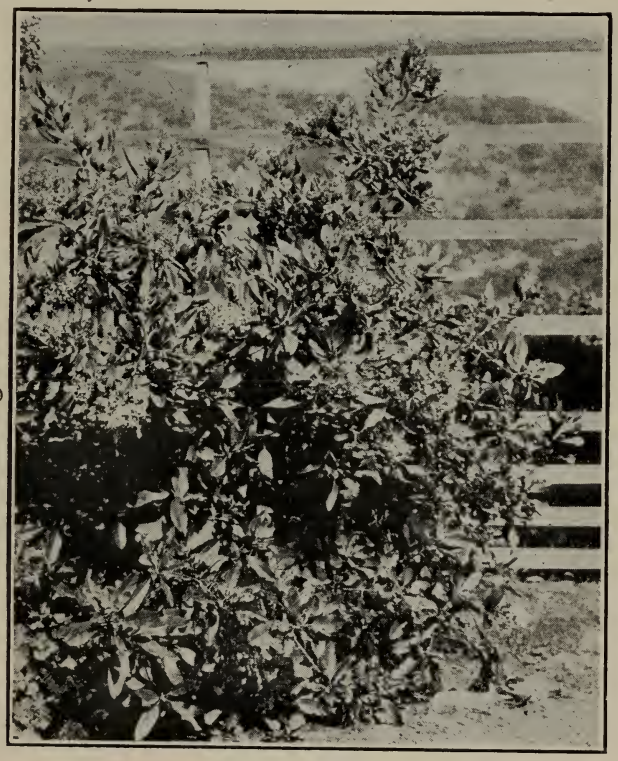

Fig. 4.—Christmas Berry.

*Prunus amygdalus* Stokes *et* var. Bitter Almond.

Introduced: under cultivation in the higher lands of the coast valleys and in some districts in the interior valleys and foothills. February.

Honey and pollen from the flowers. Where abundant, of much importance to stimulate brood rearing.

*Prunus armeniaca* L. *et* var. Apricot.

Introduced: a valley fruit; succeeds near the coast, both in southern and central California. March.

Honey and pollen from the flowers; an aid in building up bees in the spring.

*Prunus cerasus* L. Cherry.

Introduced: under cultivation principally in Alameda, Santa Clara, Solano, Napa, and Sacramento counties. March.

Among the leading honey producers of deciduous fruits. This is especially true in Sacramento County.

*Prunus domestica* L. *et triflora* Roxbg. *et simonii.* Can. Plums and Prune.

Introduced: "The plum has an exceedingly wide range in California, from the immediate vicinity of the coast and in coast valleys, where the sea winds and fogs intrude, eastward towards the great interior valleys, and upwards on the sides of the Sierra Nevada."[13]

Honey and pollen from the flowers. Sacramento County reports surplus yields.

*Prunus persica* S. & Z. *et* var. Peach

Introduced: very wide distribution; most abundant in San Joaquin Valley; eastern slopes of Coast Range; Sierra foothills at not a too high elevation. March.

Honey and pollen from the flowers. When favorable weather prevails the peach is reported to yield enough for an extraction.

*Pyrus communis* L. *et* var. Pear.

Introduced: wide range; interior valleys, foothills of the Sierra, and through the Coast Range. March.

Honey and pollen from the flowers. Perhaps the best honey producer of deciduous fruits. Warm weather at blossoming time usually means an extraction of pear honey accompanied with swarming. There is no doubt that the honey bee is the principal agent in the distribution of pear blight, but should she be excluded other bees and insects are quite capable of spreading the disease.

*Pyrus malus* L. *et* var. Apple.

Introduced: throughout the Coast Range, especially in the Pajaro Valley; southern California, and in the low lands of the Sacramento and San Joaquin valleys. March.

Honey and pollen from the flowers; surplus crops of apple honey are often reported. A question much asked is: "How many colonies of bees are required to fertilize an orchard?" Professor W. T. Clarke of this station contends that one colony is amply sufficient to fertilize 80 acres of apple bloom, and that other bees and insects aid greatly. Editor Root, however, believes that ten colonies might pollenize a ten-acre orchard, "but probably 50 or 100 would be much better."[14]

[13]Wickson, E. J. California Fruits. The Pacific Rural Press. San Francisco, 1909.
[14]Gleanings in Bee Culture. Feb. 15, 1906.

*Rosa californica* C. & S. California Wild Rose.

"Common everywhere along river and creek banks throughout California, often forming small thickets. Flowering most freely in June." *Jepson.*

A great deal of pollen from the flowers.

*Rubus strigosus* Michx. *et* var. Raspberry.

Introduced: under cultivation in many parts of the State, especially in the vicinity of large cities. April-June.

Honey and pollen from the flowers.

*Rubus villosus* Ait. *et* var. Cultivated Blackberry.

Introduced: grown in similar situations as the raspberry.

Honey and cream-colored pollen from the flowers. Yuba County reports some honey from the blackberry. Of the Himalayan variety: "It secretes nectar at a time when other berries are on the wane, and it continues well into the fall."[15] May-July.

*Rubus vitifolius* C. & S. Common Wild Blackberry.

"Common along creeks and rivers in the valleys and among the hills of the Coast Range country and Sacramento and San Joaquin valleys." *Jepson.* March-April.

Some seasons considerable honey; cream-colored pollen.

LEGUMINOSÆ. Pea Family.

*Acacia dealbata.* Silver Wattle.

Introduced: under cultivation as an ornamental throughout the State.

Honey and a quantity of yellow pollen.

**Acacia decurrens mollis.*. Wild. Black Wattle.

Introduced: widely distributed throughout the State; grown as an ornamental in our gardens and along roadsides. February-June.

Some honey and an abundance of yellow pollen in early spring.

*Acacia pycnantha.*

Introduced: Santa Barbara, and, no doubt, elsewhere. February-March.

Some honey and an abundance of yellow pollen in early spring.

*Astragalus* (sp.). Rattleweed.

Southern California. June-July.

Reported to yield honey.

*Cytisus elongatus* Borkh.

Botanical gardens of the University of California. January-February.

Very eagerly visited by bees and apparently an excellent honey plant.

[15]Pryal, W. A. Gleanings in Bee Culture. Nov. 1, 1909.

*Cytisus proliferus albus.* White Tree Clover.

Botanical gardens of the University of California. December-February.

Much the same as the above.

*Lathyrus splendens* Torr. Wild Sweet Pea.

"A very handsome species of Riverside and San Diego counties." *Abrams.* February-March.

Honey from the flowers; more favored by Bombus than Aphis mellifera.

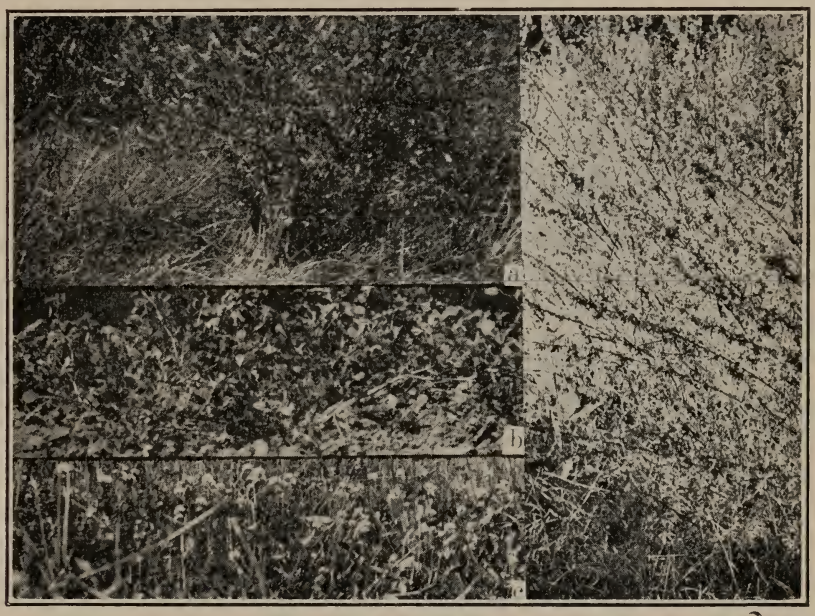

Fig. 5.—a Sweet Clover. b Burr Clover. c White Clover. d Wild Alfalfa.

**Lotus glaber* Greene. Wild Alfalfa. Deerweed. Deer Clover. Tanglefoot. Wild Broom. Fig. 5d.

"Common everywhere in the Coast ranges in the hill country: Solano and Napa counties southward to San Diego. June-September." *Jepson.*

Sacramento and Nevada counties and southern California. Blooming period from January to August.

A very erratic honey producer. Some years in some sections yielding twice as much as the sages; this is true for either the coast or valley side of the Coast ranges, yet a good wild alfalfa honey flow on the east coast does not necessarily mean such is the case on the west side. Beekeepers report wild alfalfa honey as being white, light amber, amber and at

times with a characteristic greenish tinge. It is one of the main honey plants of the Coalinga district. This plant, according to Mr. Z. Quincy of Ramona, upon reaching its second year's growth, after a mountain fire, is said to give us a great amount of nectar.

**Lupinus affinis* Agardh. Lupine.

"Vacaville, Napa Valley, Martinez, Oakland hills, San Francisco peninsula, and southward to southern California. Very common in late February and in March." *Jepson.* "Frequent in the valleys and foothills, mostly in heavy soils." *Abrams.* Santa Barbara County. January-April.

Honey from the flowers.

**Medicago denticulata* Wild. Burr Clover. Fig. 5b.

"Very common throughout California, especially on the plains, low hills and in the valleys. March-June, but flowering in most places at nearly all seasons." *Jepson.*

Honey and pollen from the flowers. An excellent clover to stimulate bees to breeding and fully the equal of filaree as a honey plant. Extractions from this source are occasionally obtained.

*Medicago lupulina* L. Nonesuch. Black Medicle.

"Uncommon: Santa Clara County. Berkeley. April-May." *Jepson.* Low lands of Sacramento County. May-July.

Honey from the flowers.

**Medicago sativa* L. Alfalfa. Lucerne.

Introduced: under cultivation in most valleys throughout the State. April-October.

Honey water-white, white, light amber and amber, according to locality, character of the soil and season of the year; of excellent body and granulates within a few months after extraction. Alfalfa, due partly to irrigation, is the most reliable honey plant of California. In those years when the Coast ranges do not receive sufficient rainfall, the output of alfalfa honey exceeds that of the sage. The San Joaquin and Imperial valleys are the two leading alfalfa honey districts. In the former, the first and last crops yield little if any honey, but the second and third, when proper climatic conditions prevail, give up a great abundance of nectar. Mr. J. T. Dunn of Fresno says that four or five days of hot weather and little or no wind, in the early part of June, will "bring out" the nectar, and insure a flow, whether or not wind or cooler weather comes later. In respect to the influence of the soil on the color of the honey, it appears that alfalfa grown on sandy soil which does not hold water will produce honey light in color, but in many portions of the valley where alluvial soil prevails, and, where water is within four to eight feet of the surface, the color of the honey is decid-

edly amber. In the Imperial Valley the flow is constant except that sometimes the first crop is a little light. Both these districts report that the color of the last extraction of honey is perceptibly darker than earlier extractions. In the Sacramento Valley considerable honey of excellent quality is procured especially when either the second or third cutting of alfalfa is allowed to go to seed. Mr. Thos. J. Mumma of Dunnigan states that alfalfa grown on light, sandy soil produces a pure white honey while that grown on heavier soils is slightly amber in color. Alfalfa fields along the coast do not yield sufficient nectar to make it worth while to the beekeeper. The miller and grasshopper often decrease the flow from the third crop in the San Joaquin Valley, whereas the alfalfa butterfly (*Eurymus eurytheme*) causes a loss to the beemen of the Imperial Valley.

**Melilotus alba* Lam. — Sweet (White Bokhara and Stone) Clover. Incorrectly called Wild Alfalfa in Yuba County. White Melilot. Fig. 5a.

"Rare in the bay region, occurring only in river beds. San Leandro Creek, *Davy,* Napa River, near St. Helena; common in moist valleys northward." *Jepson.* Rapidly spreading in the Sacramento, San Joaquin, and lower Santa Clara valleys. June-August.

Honey, white to light amber, with sometimes a slight greenish cast, medium body and of a variable flavor (mild to unpleasant); pollen dull yellow color. Much esteemed by beekeepers wherever grown, and may be found from Siskiyou to San Diego County.

*Melilotus bicolor.*

Botanical gardens of the University of California. May-July. Bees very active on bloom.

*Melilotus indica* All. — Sweet Yellow Clover. Yellow Melilot.

Very common in damp situations in many parts of the State. April-June.

Much visited by bees, but not to be ranked as a honey plant of much importance in this State. During 1910 a Colusa County beekeeper disposed of seed of this sweet clover to be sold as a bee plant. In some parts of the State indica is known as "Sour clover," thus confusing it with *T. fucatum.* In Arizona indica is commonly known as sour clover.

*Melilotus officinalis* Lam.

Sacramento and San Joaquin valleys, and probably elsewhere; known as a pest in the grain fields. May-June.

Considerable honey of a slightly amber color and not unpleasant flavor. (Yolo County.) This species is very much like indica, and may

be most easily differentiated from the above in that its yellow flowers are slightly larger.

*Phaseolus lunatus* L. *et* var. Lima Bean.

Introduced: cultivated principally in Santa Barbara, Ventura, Los Angeles, and Orange counties. July-August.

Honey, water white, heavy body and very delicious flavor. The Ventura bean fields produce most of our lima bean honey. Cool, foggy weather preceding bloom, with sunshiny days following appear to be ideal conditions for nectar secretion. The first two weeks of bloom are the best, and as much honey is secured then as is gathered during the following four weeks of what is known as the "after-bloom." Towards the last of the flow the honey darkens noticeably. Some years the lima bean louse does considerable damage to the maturing buds, thus destroying some of the first blossoms.

*Prosopis juliflora* D. C. Mesquite, Algaroba (Hawaiian Islands) Honey Mesquite.

Mohave and Colorado deserts, ranging northward to Death Valley and into the upper San Joaquin Valley in Kern County eastward toward Texas.[16]

Coachella and Imperial valleys. There are two blossoming periods, both of which vary greatly.

It is reported a good honey plant in the Imperial country, and sometimes furnishes the last crop of honey in that section. "It yields immense quantities of light amber honey of medium quality."[17]

*Robinia pseudacacia* L. Locust. False Acacia. Black Locust.

Introduced: different parts of the State, grown usually as a shade tree in cities and towns. April-May.

A surplus of white honey in Sacramento (reported) and Marin counties, and said not to be a regular yielder in parts of Monterey County.

*Trifolium fucatum* Lindl. Sour Clover.

"Common in low and often alkaline fields: Sacramento and San Joaquin valleys; Coast ranges (Napa Valley, Oakland, Santa Cruz, and Hollister, *Setchell,* and elsewhere)." May-June. *Jepson.*

Considerable honey from the flowers.

*Trifolium hybridum* L. Alsike or Swedish Clover.

Introduced: cultivated occasionally in different parts of the State. May-June.

Honey and pollen from the flowers.

[16]Jepson, W. L. The Trees of California. Cunningham, Curtiss & Welch. San Francisco, 1909.

[17]A B C of Bee Culture. Medina, Ohio, 1903.

*Trifolium pratense* L. Red Clover. Pea Vine Clover. (Mammoth.)

"Naturalized in the moister parts of northern California, and seemingly spontaneous on the islands of the Lower Sacramento. July-October." *Jepson.*

Beekeepers in the vicinity of Sacramento report bees to work upon it.

FIG. 6.—a Gorse.
b Spring Vetch.

*Trifolium repens* L. White or Dutch Clover. Fig. 5c.

"The white clover of our lawns, occasionally appearing as an escape." *Abrams.* May-June.

A great deal of honey from the flowers. Not abundant enough in

California to rank as a honey producer, yet it may rank of importance in the Klamath district.

*Ulex europaeus* L. Gorse. Furze. Fig. 6a.

On the hills of Marin County favoring sunny exposures. Blooms during all seasons, but most profusely during spring.

A very good honey plant.

*Vicia sativa* L. Spring Vetch. Tare. Fig. 6b.

Introduced: grown as a cover crop throughout the State. March-April.

Honey from the flowers.

*Wisteria* (sp.). Wisteria.

Introduced: under cultivation in the gardens of many of our homes. March-April.

Very much favored by bees as a source of honey, and apparently very constant in nectar secretion.

GERANIACEÆ. Geranium Family.

*Erodium cicutarium* L. Her. Alfilerilla (Filaree or Filere). Musk and Pin Clover. Pin Grass. Heron's Bill.

"Hillsides or barren or dry soil everywhere. Very common, beginning to flower in February or March usually some weeks in advance of the last, and in many places continuing through the summer." *Jepson.* "The prevailing species of the interior valleys and foothills." *Abrams.*

Considerable honey of good quality and excellent flavor in many localities; an abundance of yellow pollen. A very important plant to stimulate bees to breeding.

*Erodium moschatum* L. Her.

White stemmed or coarse leaved filaree as contrasted with red stemmed or fine leaved filaree (*cicutarium*). Pin clover and pin grass apply to either species.

"Abundant in rich lands of valley orchards and vineyards. March-April." *Jepson.* "The more prevailing species in the coast valleys." *Abrams.*

No distinction has been drawn between this and the former species as to their honey producing merits.

*Limnanthus douglasii* R. Ba. Marsh Flower.

Listed as a honey plant, and as a native to California in the 1910 edition of "A B C & X Y Z of Bee Culture."

A well known honey plant in England, where it is cultivated for the bees.

RUTACEÆ. Rue Family.

*Citrus acida* Hook. Lime.

Introduced: grown occasionally throughout California.

Blooming period varies.

Honey from the flowers.

*Citrus aurantium* L. *et* var. Orange.

Introduced: cultivated in the Sacramento and San Joaquin valleys, but principally in southern California. March-May.

Honey, water white, of heavy body, exquisite aroma and superb flavor; granulates within a few months after extraction. Yet beekeepers of Lindsay and Portersville report that it does not granulate for one or more years. It is more constant in the secretion of nectar than is the sage. The largest crops are in the neighborhood of Riverside and Redlands. To quote Mr. McNay of Redlands: "Four years out of five orange has yielded a fair crop, so I have been able to select and ship one or more carloads of pure orange bloom honey each year, except 1904."[18] "The scale hive showed that nearly all orange honey was secured in about five hours of each day, from eleven to four o'clock.[19] Very warm weather often produces unusual nectar secretion in such abundance that it is impossible for the bees to gather all of it. Mr. R. K. Bishop of Orange County has observed that the bees pay no attention to the large globules of nectar on the leaves, but go direct to the bloom, and it is his contention that the nectar in the bloom is much more concentrated.

*Citrus decumana* L. Grape Fruit. Pomelo. Pumelo. Shaddock.

Introduced: grown in similar situations as our other citrus fruits. Blooming period varies.

Considerable honey from the flowers, but not the equal of either the orange or the lemon.

*Citrus limon* L. Lemon.

Introduced: cultivated principally in the coast regions of southern California. Blooms all seasons of the year.

Although a valuable honey plant, it does not yield as well as the orange. This may be partly due to the proximity of lemon orchards to the coast, for, orange trees grown in similar regions do not secrete as much nectar as those of the interior valleys—a climatic factor. (A more striking example of this will be found in the case of alfalfa.)

*Citris nobilis* Lour. Mandarin. Kid Glove Orange.

Introduced: not common; cultivated occasionally in different parts of the orange belt. Blooms a little later than the above.

Honey from the flowers.

[18] Gleanings in Bee Culture. July 1, 1906.
[19] Gleanings in Bee Culture. Sept. 1, 1907.

SIMABACEÆ.

*Ailanthus glandulosa* Desf. Tree of Heaven.
Chinese Sumac. Varnish Tree.

Introduced: grown as an ornamental in some parts of the State. June.

A wonderful honey producer. The staminate bloom has a most disagreeable odor. An abundance of very ill-tasting honey.

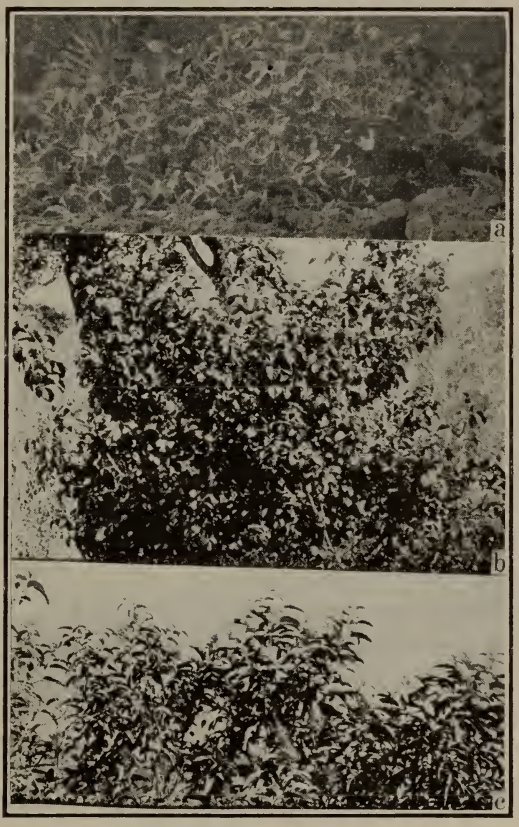


FIG. 7.—a Turkey Mullein. b Poison Oak. c Laurel Sumac.

EUPHORBIACEÆ. Spurge Family.

**Croton californicus* Arg.

"Sandy hills near the ocean, from the San Francisco peninsula southward to southern California; also near Antioch."[20] *Jepson.* "Common in dry ground throughout our range." *Abrams.* July.

Bees visit the small bloom in large numbers.

**Eremocarpus setigerus* Benth. Turkey Mullein. Woolly White
Drouth Weed. Yerba del Pascado.
Fig. 7a.

[20]Langstroth, L. L. Hive and Honey Bee. Chas. Dadant & Son, Hamilton, Ill. 1902.

"Very abundant towards the interior: plains of the Sacramento and San Joaquin; Sierra foothills; low hills and valley fields of the Coast ranges." *Jepson.* July-August.

A thick amber honey; in some localities aids the bees in filling up for winter.

*Euphorbia pulcherrima* Wild. Poinsettia.

Introduced: grown in the gardens of our homes. July.

Much visited by bees; listed as a honey plant in the 1903 edition of "A B C of Bee Culture."

*Ricinus communis* L. Castor Oil Plant. Castor Bean. Palma Christi.

"An introduced plant, which is becoming well established. In protected places it often becomes woody and tree-like." *Abrams.* June-July.

Much favored by the bees and apparently a good honey plant; pollen. Texas reports that "it is an excellent honey producer."[21]

ANACARDIACEÆ. Sumac Family.

*Rhus diversiloba* T. & G. Poison Oak. Fig. 7b.

"Everywhere common throughout California. Flowering in April and May." *Jepson.*

Some localities in Monterey County report a superior grade of white thin honey which granulates very readily. Mr. Pryal, however, states that the honey is of heavy body.[22]

**Rhus laurina* Nutt. Laurel Sumac. Fig. 7c.

"Very common in the foothills and extending well up into the chaparral; less common in the interior. June-July." *Abrams.*

Amber honey with a marked odor, but of a fine flavor. Many southern California apiaries get one or more extractings from this source.

**Schinus molle* L. Pepper Tree.

Introduced: grown in southern California and as far north as San Francisco Bay region. Blooms principally in summer, but also in spring and fall.

An excellent and regular producer of an amber and strong flavored honey.

ACERACEÆ. Maple Family.

*Acer negundo* L. Ash-leafed Maple. Box Elder.

"Common along streams from San Bernardino northward: Contra Costa County, Sonoma County, Sacramento River. March-April." *Jepson.*

Honey from the flowers, honeydew from the leaves in the fall.

[21]Gleanings in Bee Culture. Nov. 1, 1907.
[22]Pryal, W. A. American Bee Journal. Sept. 1909.

SAPINDACEÆ. Buckeye Family.

*Aesculus californica* Nutt. California Buckeye. Fig 8b.

"Coast ranges and Sierra Nevada foothills, north to south Fork Trinity and Redding, and southward to Fort Tejon and Antelope Valley."[23] June.

Yields considerable honey in some localities. A few beekeepers in the vicinity of Sacramento believe they have good evidence that the honey poisons their bees.

FIG. 8.—a California Water Weed. b California Buckeye.

RHAMNACEÆ. Buckthorn Family.

**Ceanothus cuneatus* Nutt. Nuttall's Ceanothus.

"Very abundant in the higher Coast ranges and in the Sierra foothills, either isolated or gregarious, and forming impenetrable and often extensive thickets. March-April." *Jepson.*

"Occasional along the southern rim of the San Gabriel and San Bernardino ranges." *Abrams.* Common in Santa Barbara and Ventura counties. February.

Honey and pollen from the flowers, and no doubt a valuable plant for early stimulative purposes.

[23]Jepson, W. L. The Trees of California. Cunningham, Curtiss & Welch. San Francisco, 1909.

*Ceanothus* (sp.). Wild Lilac and others.

Very common throughout the Coast ranges forming part of the chaparral belt. March-May.

Honey and an abundance of yellow pollen.

*Rhamnus californica* Esch. Coffee Berry. Buckthorn. Cascara Sagrada (erroneously).

"Common everywhere in the Coast ranges and at low altitudes in the Sierra. June-July." *Jepson.* San Diego County. April-May.

Yields an amber honey of very heavy body in the foothills of the Sierra Nevada mountains. San Diego County reports the coffee berry a good producer of an amber honey of good flavor but slightly catharic. It appears that Mr. Herold of Sonora has very good evidence that this honey has poisoned his bees.

**Rhamnus corcea* Nutt.

"Mayacamus mountains (east of Napa Valley) and southward near the coast; Oakland, etc. February-May." *Jepson.*

"Occasional on the dry plains and in the chaparral belt of our interior region." *Abrams.* Common in Santa Barbara and Ventura counties.

Honey from the flowers. Of value to induce early breeding in late winter and early spring.

**Rhamnus purshiana* D. C. Cascara sagrada. Chittam.

"Point Reyes according to Davy; scarcely known in our region, more common in northern California." *Jepson.* May.

An excellent honey plant in the northern part of the State producing an amber-colored honey.

VITACEÆ. Vine Family.

*Ampelopsis quinquefolia* Michx. Virginia Creeper.

Introduced: a common ornamental in our gardens. June-July.

An abundance of pale yellow pollen very eagerly sought after by bees.

*Vitis californica* Benth. California Wild Grape.

"Along streams throughout the Coast ranges, Sacramento and San Joaquin valleys, and Sierra foothills. May-June." *Jepson.*

Honey from the flowers.

*Vitis vinifera* L. *et* var. Wine Grape. European Grape.

Introduced: grown almost everywhere; extensively cultivated in many of our valleys and especially in Fresno County. May-June.

Some honey and green pollen. In the fall where honey-producing plants are scarce, the bees often gather and store considerable quantities of grape juice when the fruit becomes punctured by other insects or birds. This juice sometimes ferments in the cells and causes dysentery among the bees.

TILIACEÆ. Lime or Linden Family.

*Tilia americana* L. American Linden. Basswood.

Introduced: grown occasionally. Berkeley, Fresno. May-June.

Judging from the way in which bees worked upon a single tree at Fresno, it should prove to be an excellent source of honey if grown extensively here.

*Tilia* (sp.).

Introduced: single tree growing in San Rafael.

Very much worked upon by bees. May-June.

MALVACEÆ. Mallow Family.

*Gossypium herbaceum* L. Cotton.

Introduced: under cultivation in the Imperial Valley, and to some extent in Los Angeles and San Diego counties. June-August.

Honey from the flowers. Of this plant Mr. Louis H. Scholl of Texas says: "Honey yield good, steady flow till frost, honey white and of good quality. Main source throughout cotton belt. Nectar glands on ribs of leaves and on bracts of buds, blooms and bolls. June to frost."[24]

*Malva parviflora* L. Small Flowered Mallow.

"Very common in waste places, especially near dwellings in the interior valleys; flowering in spring and early summer." *Jepson.*

Honey from the flowers.

*Malva sylvestris* L. (albino). White Mallow.

Botanical gardens of the University of California. May-June.

Eagerly visited by bees.

*Sidalcea malvaeflora* Gray. Wild Hollyhock.

"High places of open fields in the valleys and on the plains, or in a reduced form on hill tops. Last of April-May." *Jepson.* Reported along roads and irrigating ditches in Imperial Valley, blooming in January.

The first honey plant of any importance in the Imperial Valley according to Mr. George of that section.

TAMARICACEÆ. Tamarisk Family.

*Tamarix* (sp.). Tamarisk.

Introduced: cultivated in some parts of the State. Santa Barbara and Fresno counties. April-June.

A very great favorite with the bees.

CISTACEÆ. Rock-Rose Family.

**Helianthemum scoparium* Nutt.

"Dry slopes and ridges of the Coast ranges, from Lake County to

[24]Texas Honey Plants. Bull. No. 102. Texas Agr. Exp. Sta.

Mt. Tamalpais and southward; not common. April-May." *Jepson.* "Frequent on dry ridges in the chaparral belt of all our mountains and foothills." *Abrams.*

Honey from the flowers during July and August in southern California.

CACTACEÆ. Cactus Family.

*Opuntia lindheimeri occidentalis* Coult. Prickly Pear. Fig. 9.

"Frequent in our valleys and foothills from Los Angeles eastward." *Abrams.* Santa Barbara and Ventura counties. May-July.

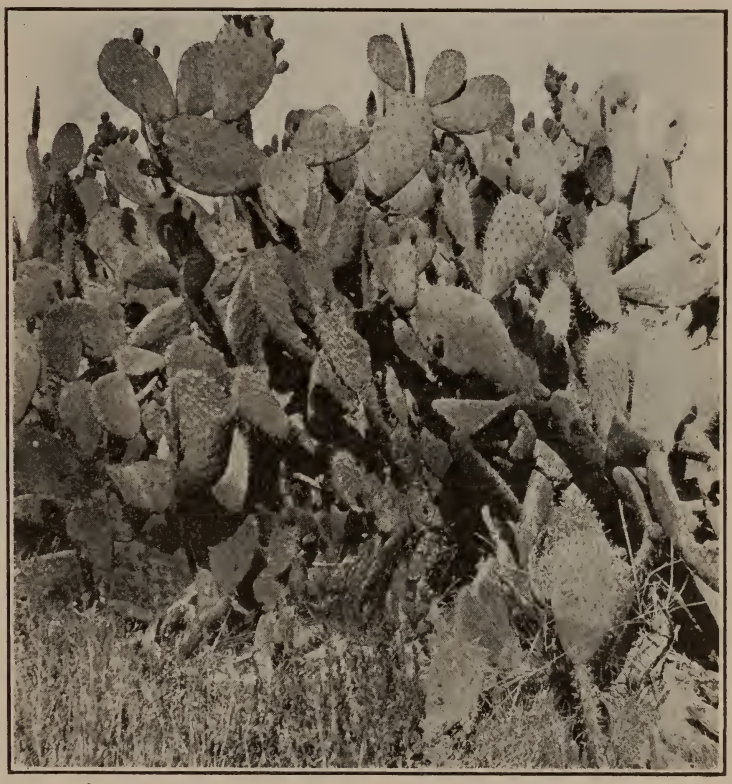

FIG. 9.—Prickly Pear.

Considerable honey from the flowers. Of the species *engelmanni*, native of Texas. Mr. Louis Scholl says: "Of much importance to the beekeeper especially during a season of partial drouth. Both an abundance of honey and pollen was obtained, the honey being light amber in color, of heavy body, but 'stringy'—so much so that it fairly draws out into 'strings' when very thick. The flavor is very rank."[25]

[25]Gleanings in Bee Culture. Apr. 15, 1907.

MYRTACEÆ.

*Eucalyptus calophylla* R. Br.[26]

Introduced: University Forestry Station, Santa Monica, and elsewhere. August-October.

Honey from the flowers.

*Eucalyptus citriodora* Bailey. Lemon-Scented Gum.

Introduced: under cultivation in many parts of California. June-July.

A splendid yielder of nectar.

*Eucalyptus cornuta* Labill. Yate Tree.

Introduced: University Forestry Station, Santa Monica, and elsewhere. May-August.

Honey from the flowers.

*Eucalyptus corynocalyx* F. & M. Sugar Gum.

Introduced: University Forestry Station, Santa Monica, and elsewhere. August-November.

Honey from the flowers.

*Eucalyptus eugonioides* Sieb. White Stringy Bark.

Introduced: University Forestry Station, Santa Monica, and elsewhere. August.

Honey from the flowers.

*Eucalyptus globulus* Labill. Blue Gum.

Introduced: extensively cultivated throughout California. December-June.

Honey, amber, of an acid flavor, heavy body and granulating within a few months. The blue gum is very constant in nectar secretion, even in spite of unfavorable weather, and, since it is of wide distribution, considerable quantities of honey come from this source. On account of the pronounced flavor of eucalyptus honey there is little or no demand for it in retail trade.

*Eucalyptus gunnii* Hook. Cider Gum.

Introduced: University Forestry Station, Santa Monica, and elsewhere. April-May.

Honey from the flowers.

*Eucalyptus lehmannii* Preis.

Introduced: University Forestry Station, Santa Monica, and elsewhere. August-September.

Honey from the flowers.

[26]See Bull. No. 196 of this Station concerning "The Eucalyptus as Bee Pasture."

*Eucalyptus leucoxylon* F. & M. White Ironbark.

Introduced: University Forestry Station, Santa Monica, and elsewhere. November-April.

Reported to be a great honey producer, with a beautiful flavor, much like a vanilla extract.

*Eucalyptus maculata* Hook. Spotted Gum.

Introduced: University Forestry Station, Santa Monica, and elsewhere. May-June.

Honey from the flowers.

*Eucalyptus melliodora* Cunn. Honey-Scented Gum.

Introduced: University Forestry Station, Santa Monica, and elsewhere. January-June.

Very eagerly visited by bees. It secretes nectar constantly throughout its long blooming period.

*Eucalyptus polyanthema* Schau. Red Box Tree.

Introduced: University Forestry Station, Santa Monica, and elsewhere. February-April.

Honey from the flowers.

*Eucalyptus phaceafolia.*

Southern California; rare.

A wonderful producer of a water-white honey, and according to Mr. M. H. Mendleson of Ventura, as many as three bees at one time have been observed to sip up from a single blossom as much nectar as it was possible for them to carry off.

*Eucalyptus resinifera* Smith. Red Mahogany Gum.
Kino Eucalypt.

Introduced: University Forestry Station, Santa Monica, and elsewhere. August-September.

Honey from the flowers.

*Eucalyptus robusta* Smith. Swamp Mahogany Gum.

Introduced: under cultivation in many parts of California. November-March.

An excellent honey tree, yielding more nectar than globulus and as much as melliodora. These three trees, with leucoxylon, appear to be the most favored by California beekeepers.

*Eucalyptus rostrata* Schlecht. Red Gum.

Introduced: under cultivation in many parts of California. May-July.

Considerable honey from the flowers; may prove of much value to the Imperial Valley beekeepers.

*Eucalyptus siderophlora* Benth. Broad (Large) Leaved Ironbark.

Introduced: University Forestry Station, Santa Monica, and elsewhere. October-November, also January.

Honey from the flowers.

*Eucalyptus sideroxylon rosea* Cunn. Victoria Ironbark. Red Ironbark.

Introduced: University Forestry Station, Santa Monica, and elsewhere. December, also March.

Honey from the flowers.

*Eucalyptus stuartiana* F. & M. Apple-Scented Gum.

Introduced: University Forestry Station, Santa Monica, and elsewhere. April.

Honey from the flowers.

*Eucalyptus tereticornis* Smith. Forest Gray Gum. Flooded Gum.

Introduced: University Forestry Station, Santa Monica, and elsewhere. May-July.

Honey from the flowers.

*Eucalyptus viminalis* Labill. Manna Gum.

Introduced: University Forestry Station, Santa Monica, and elsewhere. July-August.

Honey from the flowers.

ONAGRACEÆ.

*Godetia bottae* Spach.

Botanical gardens of the University of California. June.

Very rich in nectar.

*Jussiaea californica* Jepson. California Waterweed. Fig. 8a.

"Regions of the lower Sacramento and the lower San Joaquin, particularly in tide sloughs. July-September." *Jepson.*

Considerable honey from the flowers and supposed to be very ill-tasting in flavor.

UMBELLIFERÆ. Parsley Family.

*Daucus cariota* L. Carrot.

Introduced: under cultivation in many parts of California.

Honey white, with a characteristic flavor and granulating within a few months after extraction. A most excellent yielder in the Sacramento Valley, where it is considered to surpass the onion as a honey plant.

*Eryngium articulatum* Hook. Blue Thistle. Fig.10a.

"Common in the Suisun marshes; should be looked for in the Alvarado marshes. August-September." *Jepson.* Common along Cosumnes River, August-October.

A dark honey, but good in flavor.

*Foeniculem vulgare* Gaertn. Sweet Fennel.
Cummin. Fig. 10b.

"Waste places on old farms and by country lanes, flowering in summer: Solano County, Napa Valley, Berkeley," etc. *Jepson.* "In waste places and along streets." *Abrams.* Along roadsides in Santa Barbara and Ventura counties. May-April.

A good honey plant, producing a light amber honey.


Fig. 10.—a Blue Thistle. b Sweet Fennel. c Dodder. d Caterpillar Phacelia.

## SYMPETALAE.

### Ericaceæ. Heath Family.

*Arbutus menziesii* Hook. Madrona.

"Occasional in northern Sierra foothills and very common in the Coast ranges, especially northward. April." *Jepson.*

Honey and pollen from the flowers.

*Arctostaphylos* (sp.). Manzanita. Bear Berry.

Throughout Coast ranges; Sierra Nevada foothills, and San Bernardino Mountain (2,000 to 9,000 feet). November-February.

Honey amber and of excellent flavor, much like manzanita itself (Colusa County); pollen. San Diego County reports a white honey from the manzanita. One of our most important honey plants to induce bees to early breeding. In some parts of Monterey, Colusa, and El Dorado counties a 20 to 40 pound surplus is obtained, and on very warm days (Monterey County) nectar can be shaken from the bloom. A beekeeper of Applegate reports it to be his best honey yielder.[27]

PRIMULACEÆ. Primrose Family.

*Dodecatheon* (sp.). Shooting Star.

Reported to furnish pollen in considerable quantities in the San Joaquin Valley.

OLEACEÆ. Olive or Ash Family.

*Fraxinus oregona* Nutt. Oregon Ash.

"Along the Sacramento River and Coast Range streams, especially toward the coast. April-May." *Jepson.*

Honey from the flowers.

*Ligustrum japonicum* Thumb. Japan Privet.

Listed as a honey plant from California in the 1910 edition of "A B C & X Y Z of Bee Culture."

*Olea europaea* L. *et* var. Olive.

Introduced: under general cultivation throughout California. April-May.

Mr. T. O. Andrews of Corona and Mr. B. B. Hogaboom of Elk Grove report that bees work well upon olive bloom. The olive tree is also well known as a source of honey in Spain,[28] yet the writer's apiary (Santa Barbara, 1909) is within easy distance of 5,000 olive trees, but he has never seen more than two or three bees on any single tree, and they only were collecting pollen.

ASCLEPIADACEÆ. Milkweed Family.

*Asclepias mexicana* Cav. Milkweed.

"Forming patches in dry ground; distributed throughout California, but not near the coast within our limits." July-September. *Jepson.*

Honey from the flowers. The pollen grains of each anther are collected into a compact mass, each such mass being encased in sacs by a thread-like substance, at the end of which is situated a minute viscous gland. The bees frequently become entangled herein, and sometimes so much so that they perish in considerable numbers.

[27]Penn, Enoch. Gleanings in Bee Culture. Mar. 15, 1906.
[28]Señor Miguel Pons. Fabregeus, Barcelona.

*Asclepias speciosa* Torr. Milkweed.

"Along streams, Solano County, common in the Sierra Nevada, Marin, Contra Costa, and Alameda counties, according to Green. Last of May-July." *Jepson.*

Honey from the flowers. This species also possesses these viscous glands.

CONVOLVULACEÆ. Morning Glory Family.

*Convolvulus arvensis* L. Morning Glory. Common Bindweed.

Very wide distribution throughout California. May-July.

Bees work upon the bloom in the vicinity of Sacramento, and it appears, at times, store some honey.

*Cuscuta* (sp.). Dodder. Gold Thread. Love Vine. Fig 10c.

A parasite on many of our plants, including some of our best honey flora, such as the willow, poison oak, figwort, wild alfalfa, wild buckwheat, sages, alfalfa and others. Flowering from June to September, according to species.

Bees visit the small white flowers very freely and no doubt gather some honey.

POLEMONCIACEÆ.

*Gilia chamissonis.*

Botanical gardens of the University of California. May-June.

An abundance of sky-blue pollen.

HYDROPHYLLACEÆ. Phacelia Family.

**Eriodictyon trichocalyx* Eas. Yerba Santa.

Ventura County. June-July. Not listed by *Jepson* or *Abrams.*

An excellent honey plant frequently yielding a surplus.

*Phacelia distans* Benth. Hill Vervenia.

"Higher hills of the Coast ranges from Napa Valley to Mt. Tamalpais, the ocean at Bodega (where first collected), and southward. April." *Jepson.* "Very common in the plains and foothills. March-April." *Abrams.*

Honey and pollen from the flowers.

**Phacelia hispida* Gray. Caterpillar Phacelia. Fig. 10d.

"Very common in the chaparral belt in open grassy places. April-June." *Abrams.* Common in Ventura County. June-July.

"The honey is water white, and of fine flavor; but it candies, soon after it is extracted, to the consistency of fine paste.[29] I extracted a carload from phacelia before the sages came in."[30]

[29]Mendleson, M. H. Gleanings in Bee Culture. Dec. 15, 1908.
[30]Mendleson, M. H. Gleanings in Bee Culture. Oct. 1, 1908.

**Phacelia ramosissima* Dougl.

"Colusa and Lake counties southward to Santa Cruz. Sierra Nevada. June-July." *Jepson.* Southern California. April-June.

A fair honey plant, but not the equal of either of the three other species herein listed.

**Phacelia tenacetifolia* Benth. Valley Vervenia.

"Plains and valleys: Marysville Buttes; Sacramento Valley; Vallejo. *Greene* 1874. Tracy. April." *Jepson.*

"The honey is light amber, some times light green and of a mild, aromatic flavor. The sky-blue pollen comes from it alone."[31] Some San Joaquin Valley beekeepers call this plant "Fiddle neck."

*Wigandia* (sp.).

Introduced: Orange County and probably elsewhere.

Mr. R. K. Bishop of the above county considers it one of the best honey plants he has seen.

BORAGINACEÆ. Borage Family.

**Heliotropium curassavicum* L. Common or Wild Heliotrope. Chinese Pusley. Imperial County.

"Common along the seashore, in stream beds, and in low moist or alkaline lands throughout California. June-November." *Jepson.*

Honey from the flowers.

*Heliotropium* (sp.). Cultivated Heliotrope.

Introduced: under cultivation in the gardens in towns and cities.

Honey from the flowers. May-August.

*Tournefortia heliotropoides* Hook.

Botanical gardens of the University of California. June.

Some honey from the flowers.

VERBENACEÆ. Verbena Family.

*Duranta plumieri* Jacq. Golden Dew Drop. Tropical Lilac. Pigeon Berry.

Introduced: grown as a hedge plant in our gardens.

Mr. Morrison says, "bees go crazy over it."[33]

*Lippia lanceolata* Michx.

"Common on muddy banks of the islands lying near the confluence of the Sacramento and San Joaquin rivers; Grand Island; Bouldin Island," etc. *Jepson.* "Occasional along slow-running streams in marshy places. June-August." *Abrams.*

Valued as a honey plant, but not to the extent as is the following:

[31]Horn, H. E. American Bee Keeper. March, 1904.
[33]Gleanings in Bee Culture. Aug. 1, 1905.

*Lippia nodiflora* Michx. Carpet Grass. Mat Grass. Fog Fruit. Fig. 11a.

"Lower Sacramento and San Joaquin, especially on river banks. July-September." *Jepson.* Sacramento Valley, May-October.

The beekeepers in the regions surrounding Sacramento report the honey light, of mild flavor, good body and granulating with a very fine grain. One of the leading honey plants of the Sacramento Valley, commencing to yield about the middle of May, and lasting till frost. If the coast beekeepers are anxious for bountiful rains, it is not so with their Sacramento brothers, for, the earlier the Sacramento River recedes, the sooner are the slopes of carpet grass bordering the river drained of all excess water, a condition which means a sooner and better flow of nectar. Three fourths of the honey output of Sutter County is reported to be from carpet grass. Mr. J. J. Thornber of the University of Arizona says that nodiflora is also known under the trade name of repens.[34] As a honey producer in central Texas it is absolutely worthless.[35]

*Lippia repens* Hort. Lippia. Lawn Plant. Fig. 11b.

Introduced: cultivated as a lawn in many of our homes, especially in southern California. May-August.

Continually visited by bees while in bloom. Introduced from Rome by Dr. F. F. Franceschi of Santa Barbara, less than ten years ago, and to-day not only are thousands of acres naturalized to this lippia in our State, but also in Arizona, Mexico, Australia, and other countries.[36] This plant seeds from October to February, and takes six weeks to mature. Cuttings may be planted at any time.

*Verbena prostrata* R. Br. Wild Verbena. Common Vervain. Fig. 11c.

"Dry, open hill country throughout western California; Humboldt County, Sonoma and Vacaville, southward to Alameda County, Santa Clara County, and southern California. July-September." *Jepson.*

Reported to yield considerable honey in some localities along the coast.

LABIATÆ. Mint Family.

**Marrubium vulgare* L. Horehound. Fig. 11d.

"Common weed of old fields and waste places about farms and villages everywhere in the Coast ranges, Sacramento and San Joaquin valleys, Sierra foothills and southern California. Evergreen with us. July-September." *Jepson.* Southern California. May-June.

A splendid yielder of dark amber honey, too strong and dark for

[34]Timely Hints for Farmers. No. 83. Arizona Agri. Exp. Sta.
[35]Sholl, Louis H. The Southern Queen. Aug. 1903.
[36]"Behavior of Alien Plants at Santa Barbara." Address before American Breeders' Association at Omaha, Neb., Dec. 8-10, 1909.

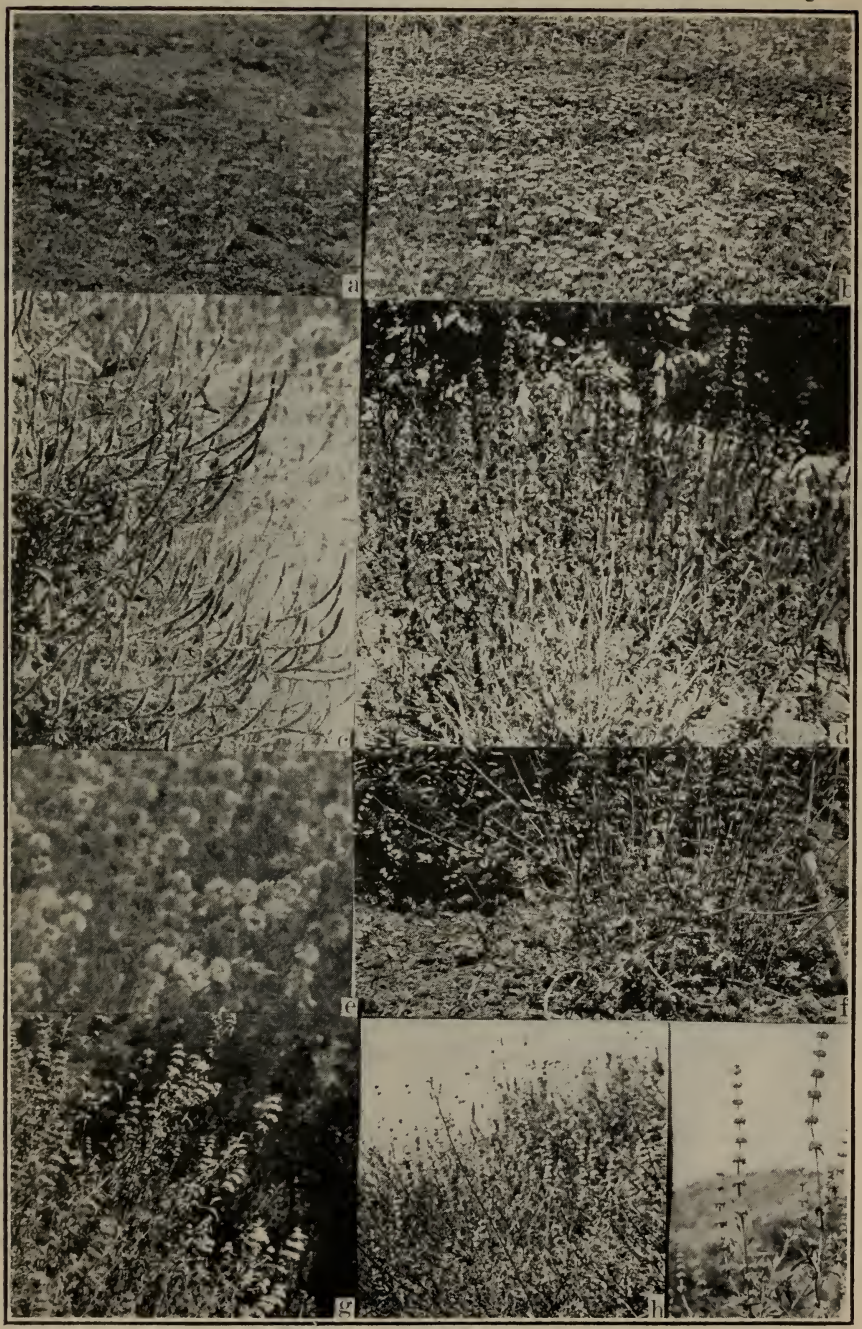


FIG. 11.—a Carpet Grass. b Lippia. c Wild Verbena. d Horehound. e Tule Mint. f Thistle Sage. g Purple Sage. h White Sage. i Black Sage.

table use, but is used largely in medicine. This honey is reported by some Ventura County beekeepers to be of a light color with a greenish tinge. It is, however, probably wild alfalfa honey, with a slight addition of horehound, for this honey is very aromatic, and requires but a small amount to impart to any honey its characteristic flavor. Ventura and Los Angeles counties produce horehound in considerable quantities. Considered a pest on a sage range, for if its nectar is gathered in even small quantities, the color and flavor of sage is impaired.

*Mentha canadensis* L. Tule Mint. Fig. 11e.

"Common in marshes; lower Sacramento and lower San Joaquin, San Francisco Bay. August-September." *Jepson.* Sacramento County. July-October.

Honey from the flowers.

*Mentha spicata* L. Peppermint. Spearmint.

"Rather common in wet places: Berkeley; Napa Valley, Lake County. Naturalized." *Jepson.* Common in lower San Joaquin Valley. August-October.

In Sacramento County and southward, yielding a great abundance of a dark amber-colored honey.

*Micromeria chamissonis* Greene. Yerba Buena.

"Common in woods near the coast: Humboldt County, Berkeley, San Francisco, Belmont, Monterey County, and southward to southern California. June." *Jepson.* "Santa Monica mountains in shady places not common. May-June." *Abrams.*

Considered a fair honey plant in some localities.

**Monardella lanceolata* Gray. (Western) Pennyroyal.

"Sierra foothills or at middle elevations." *Jepson.*

"Frequent in dry ground in the interior region in the valleys and mountains. June-August." *Abrams.* In canyons of Ventura County.

A honey plant in the foothills of the Sierra Nevada mountains.

**Salvia amabilis.* Loving Sage.

Introduced species grown in Santa Barbara. March-June.

Honey from the flowers.

**Salvia apiana* Jep. White Sage. Fig. 11h. Fig. 12a.

"Very common on the dry plains toward the foothills and ascending these to about 3,000 feet. April-July." *Abrams.* Common from Santa Barbara County southward. May-August. (*Audibertia polystachia.*)

Honey white, of superior flavor and body, and believed not to granulate. As abundant as the black sage, but not as good a yielder nor has the honey as fine a flavor.

*Salvia carduacea* Benth. Thistle or Annual Sage. Fig. 11f.

"Inner south Coast Range valleys (Contra Costa County and southward), and throughout the San Joaquin Valley; southern California, June." *Jepson.*

"Occasional in sandy soil in all the valleys and in the foothills. March-May." *Abrams.*

Honey, white and of excellent flavor; a well known honey plant in many of the above sections.

*Salvia columbariae* Benth. Chia. Annual Sage.

"Throughout the Coast ranges, Sierra Nevada, and southern California, on hill and mountain slopes. April-May." *Jepson.*

"Frequent throughout our range in the foothills and on the plains. March-May." *Abrams.*

A white honey of excellent quality, yielding a surplus in Monterey County and elsewhere.


FIG. 12.—a White Sage. b Purple Sage. c Black Sage.

**Salvia leucophylla.* Purple, White Leaved and Silver Sage. Fig. 11g. Fig. 12b.

"Occasional in the foothills of the Santa Monica and San Fernando mounttains. April-July." *Abrams.* From San Luis Obispo to San Diego counties, and not extending inland beyond the Coast ranges. (*Audihertia nivea* Benth.)

Honey, water white; unexcelled flavor; of heavy body and does not granulate. Not as abundant as the black or white sages, but a splendid yielder and the finest flavored of the sage honey. Attacked by a sage worm. This species probably crosses with both *S. mellifera* and *S. apiana.*

**Salvia mellifera* Greene. Black, Ball, Button and Blue Sage. Fig. 11i. Fig. 12c.

"Mt. Diablo, Los Trampas Ridge, near Hayward, San Mateo County, Glenwood and Loma Prieta, southward to southern California. April-May." *Jepson.* Coast ranges and ascending to 5,000 feet in the San Bernardino mountains. March-June. (*Audibertia stachyoides* Benth.) San Diego County, February-May.

Honey, water white and of a rich and delicious flavor; of heavy body especially north of San Luis Obispo; does not granulate; moderate amount of yellow pollen. This is the best honey producer on the coast, the flow being dependent upon winter rains with a warm spring quite free from cold winds and fog. When in bloom a certain amount of warm weather is required before it will produce nectar. As a general rule, every fifth year an excellent crop is obtained, and every third or fourth year a total failure is experienced. That which is commonly known as "California White Sage Honey" throughout the United States and Europe is not from the white sage, but the black sage. The white sage yields comparatively little honey as compared with either the black or purple sage. The sage worm, in cloudy weather, often becomes abundant enough to destroy much of the bloom. Dodder and a rust (*Puccinia*) also do damage in certain localities. There is a cross between this species and *S. apiana.* For the correct botanical history of the melliferous sages, see H. M. Hall, Pacific Rural Press, February 22, 1908.

**Salvia sonomensis* Greene. Creeping Sage. Ramona.

"Montana species at middle altitudes, Ramona, mountains west of Calistoga, Mt. Shasta, Calaveras, and Mariposa counties, San Diego County. May." *Jepson.* Also June. Sierra foothills from Sierra to Inyo counties, usually in shaded situations. April 1-May 15. (*Audibertia humilis* Benth. *Ramona humilis* Greene.)

Honey, water white and of excellent flavor; the main source of honey in many of the above districts. Believed not to granulate.

**Salvia spathacea* Greene. Humming Bird Sage. Crimson Sage.

"Coast ranges from the Vaca mountains, Mt. Diablo and San Francisco, southward to Santa Monica. April-May." *Jepson.* (*Audibertia glandiflora* Benth.)

This has often been termed a honey plant, but the corollas are much too deep for bees. The humming bird appears to be the only visitor of this bloom.

*Satureia montana* L. Winter Savory.

Botanical gardens of the University of California. June.

Much liked by bees.

*Stachys ajugiodes* Benth.

"Everywhere common in low lands in the Coast ranges and Sacramento and San Joaquin valleys." May-August. *Jepson.*

Honey from the flowers.

*Stachys albens* Gray. White Hedge Nettle.

"Along rivulets or near springs in the dry inner Coast ranges, Knoxville grade to Lower Lake, Livermore Pass, Pacheco Pass. July-August." *Jepson.* Fresno County. June.

Honey from the flowers.

*Stachys bullata* Benth. Hedge Nettle.

"The most common species, found everywhere among the low hills of the Coast ranges. March-April." *Jepson.*

"It is very rich in nectar and furnishes considerable forage for the bees."[37]

*Trichostema lancealatum* Benth. Blue Curls. Vinegar Weed. Purple Blue Curls (Orange County). Mustang (Sacramento County). Camphor Weed (Tulare County). Nigger Weed (San Bernardino County). Flea Weed( Los Angeles County). Fig. 13a.

"Dry plains and low hills throughout the Coast ranges, southern California to Saratoga, Los Gatos, Alvarado, Lafayette, Vacaville, Winters, Healdsburg, and northward. Sierra foothills. A bee plant in Fresno County, where it abounds in many localities, and "yields a white honey that granulates remarkably quick." *O. L. Abbott.* August-September. *Jepson.* "Frequent in dry fields, especially on the mesas of our interior valleys. June-September." *Abrams.*

San Bernardino mountains (2,300 feet), Ventura County and Santa Ynez Valley. Sacramento Valley. August-November.

A milk-white honey, and one of our quickest honeys to granulate, doing so with a very fine grain. This honey has often been observed to granulate in the cells before the bees were ready to seal them. Blue curls usually commences to yield in August and continues till frost. A beekeeper of Fresno reports that should a light rain fall during September, a terrific flow will follow and tons of honey are stored by the bees. Some beekeepers in the San Bernardino mountains maintain that a September rain decreases the flow of nectar from blue curl. A very attractive table honey when sold in small crystallized blocks, yet the bulk of this honey goes to biscuit manufacturers.

[37]Pryal, W. A. American Bee Journal. April, 1909.

Scrophulariaceæ. Figwort Family.

**Scrophularia californica* Cham. California Figwort. Fig. 13b.

"Common in moist places, mostly along gulches in the hills, Coast ranges, Sierra Nevada, southern California. May-June." *Jepson.* In southern California blooms as early as March.

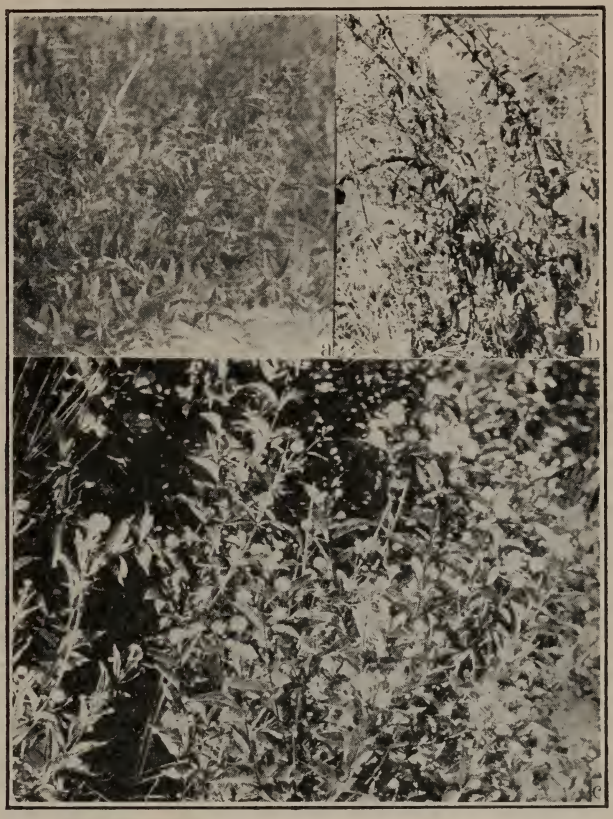

Fig. 13.—a Blue Curls. b California Figwort. c Button Willow.

Excellent honey plant, and although it is never abundant, there is no doubt that some figwort honey is stored.

*Scrophularia vernalis.* Simpson's Honey Plant.

Introduced: under cultivation by M. H. Mendleson of Ventura. April-June.

Thrives as well as does our native species, and is much visited by the bees.

*Veronica andersonii* L. & P.

Botanical gardens of the University of California. June.

*Stachys ajugiodes* Benth.

"Everywhere common in low lands in the Coast ranges and Sacramento and San Joaquin valleys." May-August. *Jepson.*

Honey from the flowers.

*Stachys albens* Gray. White Hedge Nettle.

"Along rivulets or near springs in the dry inner Coast ranges, Knoxville grade to Lower Lake, Livermore Pass, Pacheco Pass. July-August." *Jepson.* Fresno County. June.

Honey from the flowers.

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San Bernardino mountains (2,300 feet), Ventura County and Santa Ynez Valley. Sacramento Valley. August-November.

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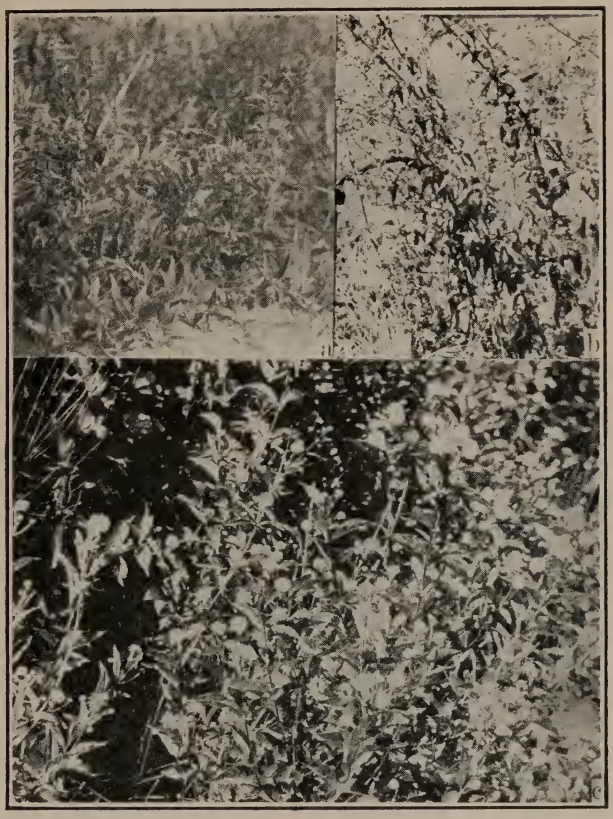
[37]Pryal, W. A. American Bee Journal. April, 1909.

SCROPHULARIACEÆ. Figwort Family.

**Scrophularia californica* Cham. California Figwort. Fig. 13b.

"Common in moist places, mostly along gulches in the hills, Coast ranges, Sierra Nevada, southern California. May-June." *Jepson.* In southern California blooms as early as March.



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*Veronica andersonii* L. & P.

Botanical gardens of the University of California. June.

PLANTAGINACEÆ. Plantago Family.

*Plantago major* L. Common Plantain. Buck Plantain.

"Not uncommon in low fields and waste places." *Jepson.* May-June.

Honey and white pollen from the flowers during the forenoon.

RUBIACEÆ. Madder Family.

*Cephalanthus occidentalis* L. Button Willow. Button Bush. Fig. 13c.

"Common along interior streams, especially the San Joaquin and Sacramento rivers, some times growing 40 feet in height. August-September." *Jepson.* Sacramento Valley, July.

Honey very light in color and of a mild flavor. A good honey plant in the Sacramento Valley, but not abundant enough to figure as a good surplus yielder. The button bush is well known as a honey plant along the Mississippi River.

CAPRIFOLIACEÆ. Honeysuckle Family.

*Lonicera* (sp.). Wild Honeysuckle.

Common throughout California. May-June.

Reported to yield some honey.

*Lonicera caprifolium* L. Cultivated Honeysuckle.

Introduced: a common vine in the gardens of our homes.

Honey from the flowers.

**Sambucus glauca* Nutt. Blue Elderberry.

"Common in open woods or canyons of the lower hill country, or at middle altitudes, or along stream banks in the valleys: Coast ranges, Sacramento and San Joaquin valleys, Sierra Nevada. May-August." *Jepson.* "Frequent on low hills and in wastes in all the valleys. May-June." *Abrams.*

No honey; excellent as a source of pollen of a yellow color.

CUCURBITACEÆ. Gourd Family.

*Citrullus vulgaris* Schad. Watermelon.

Introduced: under cultivation throughout California. May-August.

Considerable honey and pollen from the flowers.

*Cucumis melo* L. *et* var. Cantaloupe. Muskmelon.

Introduced: under cultivation throughout California, especially in the Imperial Valley. January-May.

Reported to be of importance in the Imperial Valley for its yield of pollen during the early part of spring.

*Cucumis sativus* L. Cucumber.

Introduced: under cultivation throughout California. May-August.

Honey and pollen from the flowers.

*Cucurbita pepo* L. Pumpkin.

Introduced: under cultivation throughout California. May-August.

An amber honey granulating very rapidly and containing a great deal of pollen.

*Cucurbita maxima* Duchesne. Summer Crookneck Squash.

Introduced: under cultivation throughout California. May-August.

Honey and pollen from the flowers.

*Cucurbita moschata* Duchesne. Winter Crookneck Squash.

Introduced: under cultivation throughout California. May-August.

Honey and pollen from the flowers.

COMPOSATÆ. Sunflower Family.

*Anthemis cotula* L. May Weed. Dog Fennel. Fig. 14a.

"Very common late spring or summer weed in pastures and neglected lands throughout California." *Jepson.*

Light yellow, but very bitter-flavored honey; pollen.

Blooming as it does between the spring and summer it has proved to be of considerable value to many Sacramento Valley beekeepers.


FIG. 14.—a May Weed. b Common Sunflower. c Coast Tarweed. d Tarwed. e Yellow Tarweed. f Western Goldenrod.

*Artemisia californica* Less. Sage Brush. Old Man. Hill Brush.

"Common on hills of the upper Sonora zone, from lower California north to San Francisco Bay; most plentiful towards the coast." *Hall.*

Much valued for its very early and abundant pollen. The sage brush is often mistaken for the true sages which belong to the genus *Salvia* and not *Artemisia*.

*Bidens frondosa* L. Beggar Ticks.

"Lower Sacramento River; very common. September." *Jepson.*

Listed as a honey plant in the 1910 editions of "A B C & X Y Z of Bee Culture."

**Bidens pilosa* L. Spanish Needle.

"A native of the tropics; frequent in southern California as a weed." *Hall.* June-July.

A light amber honey.

*Centaurea cyanus* L. Cornflower.

Introduced: under cultivation in many of our homes. May-June.

Honey and pale yellow pollen from the flowers.

*Centaurea melitensis* L. Napa Thistle. Tocalote.

"Abundant everywhere in agricultural lands and pastured hills. May-June." *Jepson.*

Reported to yield some pollen in the San Bernardino mountains, but nevertheless a very obnoxious weed, and beekeepers of this section are unanimous for its eradication. In Sacramento County, however, Mr. B. B. Hogaboom reports this thistle to yield a honey light amber in color, of good flavor and fair body from May 15 to June 15. It abounds on the sage ranges of Ventura County, but has never been known to yield any nectar there.

**Centromadia pungens* Greene. Spikeweed.

"Abundant on the plains of the lower San Joaquin, southward to southern California and westward to Walnut Creek and Alameda. On the alkaline plains of the upper San Joaquin this species covers tens of thousands of acres and often forms thickets four or five feet high. It is a valued bee plant. Carloads of spikeweed honey are shipped annually from Fresno County, the honey is of amber color, good quality and granulates quickly." *O. L. Abbott. Jepson.*

It is not any longer the honey plant it once was among the San Joaquin Valley beekeepers. Such plants as blue curls, alkali weed, and jackass clover, all blooming about the time spikewood does, appear to be better liked fall honey plants among the valley beekeepers.

*Cirsium lanceolatum* Scop. Bull Thistle.

"European species, introduced in recent years in the bay region: Berkeley, lower San Joaquin," etc. *Jepson.* Sacramento County. June-August.

Considerable honey from the flowers.

**Coreopsis gigantea* Hall.

"Near the coast from Los Angeles County to San Luis Obispo County." *Hall.*

Botanical gardens of University of California. February.

Honey from the flowers; a great favorite of the bees.

*Cynara scolymus* L. Globe Artichoke.

Introduced: cultivated in our truck gardens and elsewhere. June-July.

Greedily visited by bees.[38]

**Encelia californica* Nutt.

"Common on dry hillsides of the upper Sonoran zone throughout southern California, except on the desert." *Hall.* January-April.

Honey and pollen from the flowers. At times quite frequently visited by bees.

**Erigeron foliosus* Nutt.

"Common in the hill country: Marin County to the San Francisco Peninsula, Leona (Alameda County), Mt. Diablo and southward. June-August." *Jepson.* "Common on hills and in the mountains up to 2,100 feet altitude throughout California." *Hall.*

Honey from the flowers.

**Eriophyllum confertiflorum* (D. C.) Gray.

"Abundant on dry hills from San Diego north throughout western California." *Hall.* April-July.

Honey from the flowers.

**Helianthus annus* L. Common Sunflower. Fig. 14b.

"Plains of the San Joaquin and Sacramento valleys, first appearing in low places along country roads. July-September." *Jepson.*

"Common along roadsides and in waste places throughout western North America." *Hall.*

An amber honey, with a most characteristic flavor, not unliked by many. In some years the wild sunflower produces very heavily. Mr. Mendleson a few years ago shipped a carload of this honey from Ventura County. Sacramento County also reports favorable yields of a black colored honey with a shiny appearance.

*Helianthus tuberosus.* Jerusalem Artichoke.

Introduced: cultivated in our truck gardens and elsewhere. June-July. Greedily visited by bees.[39]

**Heterotheca grandiflora* Nutt.

"Emigrant from southern California; San José, etc. August-October." *Jepson.*

[38] Pryal, W. A. Gleanings in Bee Culture. May 1, 1909.
[39] Pryal, W. A. Gleanings in Bee Culture. May 1, 1909.

"A common weed along ditches and in waste places, throughout southern California except in the mountains." *Hall.* Ventura County. June.

Honey and pollen from the flowers.

**Hieracium aurantiacum* L. Orange Hawkweed.

Botanical gardens of University of California. February.

Honey and pollen from the flowers.

*Hemizonia corymbosa* T. & G. Coast Tarweed. Fig. 14c.

"Abundant in valley fields and on hillsides. Berkeley to Santa Cruz and Monterey County. June-July." *Jepson.*

Some honey from the flowers, but not near as good a honey plant as the two following species:

**Hemizonia fasciculata* T. & G. Tarweed.

"On mesas throughout southern California, except on the desert, north to San Francisco Bay; common especially towards the coast and on the islands." *Hall.* June-August.

Honey dark amber, with strong tarweed aroma (preferred by some to the milder honeys), and granulates two or three months after extraction. An excellent producer along the coast extending from Santa Barbara to San Diego County. The honey is reported to be used largely in the manufacture of chewing tobacco and shoe blacking.

*Hemizonia virgata* Gray. Yellow Tarweed.

"Common on the plains of the Sacramento Valley (Suisun, Vorden, Galt, etc.) and the San Joaquin Valley and in the valleys of the inner south Coast ranges. August-October." *Jepson.*

Honey of light yellow color, good flavor and heavy body. This tarweed is a heavy and consistent yielder, beginning in August and lasting for about twenty days, according to Mr. B. B. Hogaboom of Elk Grove.

*Hemizonia* (sp.). Yellow Tops. Yellow Tarweed. Vinegar Weed.

The tarweed of Fresno County, generally known as "Yellow Tops," blooms from April to June, and is reported to yield an occasional surplus. "Vinegar weed" has been applied to a tarweed in the San Joaquin valleys. The tarweed (probably *H. corymbosa*) of the San Antonio Valley (Jolon), although very abundant, is reported not to produce enough honey for an extraction.

**Malacothrix saxatilis* T. & G.

Frequent in Santa Barbara and Ventura counties. June-July.

Some honey and pollen from the flowers.

**Senecio douglasii* D. C.

"Common throughout southern California in the upper Sonoran zone, especially in sand-washes and other gravelly places; north to Lake County." *Hall.*

Honey from the flowers.

*Solidago occidentalis* Nutt. Western Golden Rod. Fig. 14f.

"Marshes, stream beds and river banks; Sierra Nevada, Sacramento, and San Joaquin Valley; Coast ranges; southern California. August-October." *Jepson.*

Honey from this source is amber in color. A honey plant with Mr. Wm. Muth-Rasmussen of Independence.

*Solidago californica* Nutt. Common Golden Rod.

"Common on dry plains and hillsides or in the mountains throughout California. September-November." *Jepson.* "In dry, open places from the lower foothills to 3,000 feet altitude in the mountains. August to December." *Hall.*

Honey and pollen from the flowers. A fair honey plant.

*Sonchus oleraceus* L. Common Sow Thistle.

"Naturalized European weed; old fields and waste places, flowering at all seasons." *Jepson.*

Honey from the flowers.

**Sonchus maruanthus.*

Botanical gardens of University of California. February-April.

Honey and pollen from the flowers; much visited by bees.

*Chrysothamnus nauseosus hypolluca.* (White) Rabbit Brush.

Vicinity of Independence. September-November.

"Bees work vigorously on it, but the honey is dark, of poor flavor and disagreeable odor. When the bees evaporate it at night, it can then be smelled all over the place." Mr. Wm. Muth-Rasmussen, Independence, California.

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## STATION PUBLICATIONS AVAILABLE FOR DISTRIBUTION.

### REPORTS.

1896. Report of the Viticultural Work during the seasons 1887-93, with data regarding the Vintages of 1894-95.
1897. Resistant Vines, their Selection, Adaptation, and Grafting. Appendix to Viticultural Report for 1896.
1902. Report of the Agricultural Experiment Station for 1898-1901.
1903. Report of the Agricultural Experiment Station for 1901-03.
1904. Twenty-second Report of the Agricultural Experiment Station for 1903-04.

### BULLETINS.

*Reprint.* Endurance of Drought in Soils of the Arid Region.
No. 128. Nature, Value, and Utilization of Alkali Lands, and Tolerance of Alkali. (Revised and Reprint, 1905.)
133. Tolerance of Alkali by Various cultures.
147. Culture Work of the Sub-stations.
149. California Sugar Industry.
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162. Commercial Fertilizers. (Dec. 1, 1904.)
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167. Manufacture of Dry Wines in Hot Countries.
168. Observations on Some Vine Diseases in Sonoma County.
169. Tolerance of the Sugar Beet for Alkali.
170. Studies in Grasshopper Control.
171. Commercial Fertilizers. (June 30, 1905.)
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184. Report of the Plant Pathologist to July 1, 1906.
185. Report of Progress in Cereal Investigations.
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210. Imperial Valley Settlers' Crop Manual.
211. How to Increase the Yield of Wheat in California.
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CIRCULARS.

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